THE IRON TRADE REVIEW

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HIGHER PRICES

ON STEEL-MAKING IRON FOLLOW RECENT BUYING

And Demand is Active—Foundry Pig Iron Rather Quiet—Possibility of Foreign Competition Has Influence.

Following the heavy buying of steel making irons by the Cambria Steel Co. last week, there has been increased interest in the market for these grades, and quotations have been advanced. The Republic Iron & Steel Co. has purchased 20,000 tons of Bessemer at $19 and inquiries are pending from several other large interests, but the inquiry has been accompanied by some informality and indirection, the buyers evidently desiring to sound the market pretty thoroughly, before making their actual needs known. Other sales include 3,000 tons for November and December at $18.50, valley, 4,000 tons at $18.50, valley, for November, and 4,000 tons at $18.75, valley, for December, and about 14,000 tons at $19 for first quarter. Only a small tonnage of unsold Bessemer for this year and first quarter of next remains in the valley and Pittsburg territory. The basic market has been active, particularly in the eastern district, where sales have amounted to at least 40,000 tons, and important inquiries are pending at Chicago and St. Louis. The Steel Corporation has bought a few thousand tons of basic for its Pencoyd works. A sale of 5,000 tons of basic is reported at St. Louis. In foundry irons, moderate sales have been made in some parts of the country, but on the whole, buying is not so active as it was a few weeks ago. In the south, the price for first quarter seems to be established at $15, Birmingham, but there is still some spot iron available at $14.50. The firmness with which iron is being sold by southern Ohio producers is adding strength to the southern market. Prices on charcoal iron have been advanced 50 cents per ton.

Foreign Imports

A strong probability that an import movement of large proportions would follow rapid advances of quotations in this country is having an important influence on the market, especially in semi-finished and finished products. One lot of German billets has been purchased for import and there is an active inquiry for foreign steel in this country, not only on the seaboard, but as far west as the Mississippi river. Imports of steel scrap are coming in from England and the Netherlands.

Railroad Buying

The New York Central is expected to place an order for 4,000 cars at an early date. The Great Northern has ordered 1,000 ore cars from the Pressed Steel Car Co., and inquiries from other ore carrying roads are pending. There is a decided shortage of ore cars in the Lake Superior district. The Lehigh Valley has ordered 750 50-ton gondolas and 150 refrigerator cars from the Standard Steel Car Co., and 250 50-ton gondolas from the Cambria Steel Co. The Gilmore & Pittsburg has ordered 100 steel gondolas from the Pressed Steel Car Co., and the Michigan Central has placed an order for 7,800 tons of structural material with the McClintic-Marshall Construction Co., Pittsburg, for platforms for the new terminal at Detroit. Some of the large plate makers are far behind in delivering plates to car builders.

Buying of Iron Ore

Seldom, if ever, has there been such a clean-up in ore as is being witnessed this year. It is impossible to buy any Lake Superior Bessemer, and it seems very probable that some furnaces will not find their supply equal to their requirements. Some ore of low grade, which had been piled up a number of years, has been sold recently.

Finished Material

Contracting for the first quarter and first half of next year for bars, shapes and plates, is being done in a very conservative way, but contracts are not being sought by sellers, and are being made only with favored customers. The bar iron trade shows improvement. The Republic Iron & Steel Co. has started its Toledo mill which had been idle several years. Quotations on bar iron are somewhat higher. On plates, it seems probable that the ruling price for the first quarter will be 1.55c, Pittsburg, and for the second quarter, 1.60c.

Coke Prices High

There is less excitement in the coke market, but prices are still high. Furnace interests are slow to make contracts until they become satisfied that present prices will not decline with improvement in the labor situation in the Connellsville region.

REPUBLIC BUYS BESSEMER PIG IRON.

(Special Telegram.)

Pittsburg, Oct. 13.—The Republic Iron & Steel Co. has bought 20,000 tons of Bessemer for first quarter delivery at $19, from the Bessemer association. A large tonnage purchased by a valley furnace interest at $19, valley, delivery first quarter, is also reported.

There is considerable new inquiry for basic in the market, and a sale of 1,000 tons for prompt shipment at $17, valley, has just been closed. The Pennsylvania Railroad Co. is in the market for from 3,000 to 6,000 tons of special analysis foundry and car wheel iron for Altoona for first quarter.

THE WEEK IN IRON CENTERS

PITTSBURG.

Foreign Billets Purchased—Bessemer and Basic Pig Prices Advanced.

Office of THE IRON TRADE REVIEW, 510 Park Building, Oct. 12.

With a heavy tonnage standing on mill books to which current specifications are gradually adding and with capacity operations of mills in a number of lines assured for several months to come, a conservative note is being more clearly sounded on all sides in the iron and steel industry. Further selling into the future is being done with caution and though a buying movement of considerable extent for the first quarter is now under way, makers are not disposed to be free with their bookings, but rather are holding the situation within reasonable check. The basis for this attitude is attributable in a large degree to the present congested state of deliveries and to the purpose to keep the market, as far as possible, unobstructed by optional or speculative tonnage.

In some lines of the industry where more liberal policies of selling are being pursued, the manufacturers are having some trouble to hold down the stated requirements of consumers in extended contracts, as there is an inclination shown by some to allow their optimism as to the future to express itself in excessive estimates of probable needs. As regards prices, the present level in the estimation of some of the leading makers is holding closely to the logical position under the conditions of the industry now in force. Gaged from this sentiment it would appear likely that future advances will follow a gradual and orderly upward trend.

The immediate possibility of foreign importation becoming a factor in the domestic market is indicated in the sale of a small tonnage of standard billets for delivery by a European mill, just made to a consumer on the eastern seaboard. Generally, importers report a strong inquiry for various forms of semi-finished material from foreign mills and this interest is extending as far inland as the Mississippi river, leading to the expectation that further selling of note may soon be done. The reduced tariff duties and the scarcity of steel in domestic markets which has approached an acute stage in some quarters, is providing an exceptionally favorable opportunity for the foreign maker to dispose of a portion of his output in this country.

In the Pittsburg district the industry shows continued evidence of strength. The Carnegie Steel Co. is now making pig iron at a higher rate than ever before in its history, having now in operation 57 out of 59 furnaces, a numerical percentage of 97, which is equivalent to about 99 per cent of possible output. The Carrie No. 7 furnace, which had been out for relining, has just been blown in. This places in blast practically a full complement of the 62 furnaces in the Pittsburg district, owned by both the subsidiaries of the United States Steel Corporation and the independents, as the only idle stack is one which has not been in use for years.

Pig Iron.—The rising market in pig iron continues, but this is more pronounced in the steel making grades. Quotations on both Bessemer and basic irons reached higher levels in the week, and other grades also displayed increasing strength, although steel making pig has been dealt in the more heavily.

In Bessemer, $19, valley, has been done in several transactions of the past few days and the market's minimum is now $18.50, valley. Transactions for about 6,000 tons, which were not of the open market nature, were made at $19, valley, deliveries to run this year and first quarter. A lot of 500 tons for equal monthly installments, November to April, and a small tonnage also went at this price. Other sales of the week include 3,000 tons for November and December, $18.50, valley, and smaller lots at the same price. The large purchase of 54,000 tons of Bessemer by the Cambria Steel Co., which was reported last week, has left only a small tonnage of unsold Bessemer for this year and first quarter in valley and Pittsburg territory, and this is contributing to the market's strength. There has been some quiet buying of malleable for forward shipment at $17.50 to $18, valley, sales of the week having reached several thousand tons.

Basic has settled to a minimum of $17, valley, for prompt shipment. A furnace interest paid this for 1,000 tons to apply upon a contract. A steel company attempting to buy for first quarter, but being unwilling to pay furnace prices, took 1,000 tons of prompt basic through a middleman, and is reported to have shaded $17, valley. Considerable basic purchased at previous low prices has been in middlemen's hands, and much of this is now coming out at quotations generally under those of the furnaces, which range up to $17.50, valley. A Chicago buyer is reported to have taken 5,000 tons from a Buffalo furnace, shipment to be made by water.

The small users of foundry iron are covering for their needs and large sales are the exception. One local melter was in the market this week for 1,500 tons of Nos. 2 and 3 for first quarter, but withdrew the inquiry. Sales of spot foundry iron at $17.25, valley, are reported and in some instances small contracts for first half have been made at $17.50, valley. The requirements of forge consumers in this territory appear to be well filled through old time contracts, which have been adjusted to current market prices and through more recent buying. Sales have been made on a valley basis of $16.20, furnace, for nearby delivery, but some makers have refused $16.50, valley, on sizeable lots for next year. On prompt and future shipment this year on northern iron, we quote as follows:

Bessemer, valley	$ 18.50
Bessemer, Pittsburg	19.40
No. 2 foundry, Pittsburg	17.90 to 18.15
Gray forge, Pittsburg	17.15 to 17.40
Basic, valley	17.00 to 17.25
Basic, Pittsburg	17.90 to 18.15

Ferro-Alloys.—Some ferro-manganese, which it was necessary to move quickly, has been offered lately at $42.50, seaboard, for prompt shipment and a few sales have been made at this price, but sellers generally are asking $43 and upward and are getting business. There has been selling into the second half of next year and some concessions have been made, but English makers are now advancing prices. Higher than the quoted prices have also been obtained in some cases. In 50 per cent ferrosilicon small sales have been made at $64.50, delivered, Pittsburg. The general alloy market is quiet.

We quote ferro-manganese at from $43 to $44, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $44.50 to $45.50, Baltimore. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $64 to $65, Pittsburg; domestic, 12 per cent, $26; 11 per cent, $25; 10 per cent, $24; Pittsburg, for

prompt with $1 advance for first quarter and $2 for first half. The foreign grades are held at advanced prices.

Plates.—All the leading car makers are actively interested in the New York Central inquiry for cars, which is expected to be closed shortly. It is believed that the new purchase of this road will number at least 4,000 cars. The Lehigh Valley railroad has ordered 750 50-ton gondola steel cars and 150 refrigerator cars from the Standard Steel Car Co., Pittsburg, for which about 10,000 tons of steel will be furnished by the Carnegie Steel Co. The same road has also ordered 250 50-ton steel hoppers from the Cambria Steel Co., and the Gilmore & Pittsburg railroad has closed for 100 steel gondolas with the Pressed Steel Car Co. The Duluth, Missabe & Northern railway and the Duluth & Iron Range railroad are both figuring on blocks of steel ore cars. Some of the large plate makers are so heavily booked ahead that they are passing considerable business. Some of the mills are enabled to deliver plates within four to six weeks, but these are filling up and deliveries are becoming more extended. Outside mills have been offering plates for next year's shipment at 1.60c, Pittsburg, but the market's minimum remains 1.50c. We quote the market as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.50c to 1.60c. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches, up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Heavy buying of sheets for deliveries running through the first quarter is being done, and much of this is by the manufacturing trade. In a number of cases, consumers have largely increased their estimates of future requirements and the mills are having some difficulty to keep the element of speculation in excessive estimates of needs out of contracts. Deliveries on any assortments of size run from six to seven weeks. Heavy stocks of some grades which had been carried by some mills are now largely depleted as to the most sought gages. We quote the present schedule of prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.65c; Nos. 9 to 10 1.70c; Nos. 11 and 12, 1.75c; Nos. 13 and 14, 1.80c; Nos. 15 and 16, 1.90c; box annealed sheets, Nos. 10 to 12, 1.95c; Nos. 13 and 14, 2.00c to 2.05c; Nos. 15 and 16, 2.05c to 2.10c; Nos. 17 to 21, 2.10c to 2.15c; Nos. 22 to 24, 2.15c to 2.20c; Nos. 25 and 26, 2.20c to 2.25c; No. 27, 2.25c to 2.30c; No. 28, 2.30c to 2.35c; No. 29, 2.35c to 2.40c; No. 30, 2.45c to 2.50c; galvanized sheets, Nos. 13 and 14, 2.35c to 2.40c; Nos. 15 and 16, 2.45c to 2.50c; Nos. 17 to 21, 2.55c to 2.60c; Nos. 22 to 24, 2.70c to 2.75c; Nos. 25 and 26, 2.90c to 2.95c; No. 27, 3.10c to 3.15c; No. 28, 3.30c to 3.35c; No. 29, 3.45c to 3.50c; No. 30, 3.70c to 3.75c; painted roofing sheets, $1.60 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.85 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—There is a strong buying movement in tin plate for first quarter under way among the packers and canners, metal ware manufacturers and other classes of consumers and jobbers. The mills generally are being asked to cover increased requirements for these buyers. There is some reluctance to accept contracts for next year's shipment among those tin plate makers who are not in comfortable positions relative to their tin bar supplies, as higher future prices in both steel and pig tin appear very likely. We quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.50 f. o. b. mill, Pittsburg district.

Rails and Track Material.—A fair tonnage in small lots of standard rails ranging from 1,000 tons down is being taken by the local maker, and the Edgar Thomson mills are working largely upon this class of orders, as it is too early for the rolling of next year's allotments to be started. The mills are running rather easily at present, but have good prospects of being booked to capacity for next year. Light rail tonnage is coming out steadily and price advances are being made by the principal mills. Last week the Carnegie Steel Co. booked 3,600 tons, which is a heavy weekly record. Track fastenings generaly are in strong demand and higher prices are being asked by some makers. We quote the market on Bessemer rails as follows, the base price for open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 8-pound, $31; 12-pound, $30; 16 to 25-pound, $28; 30 to 35-pound, $28.75; 40 to 45-pound, $27; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.70c to 1.75c, Pittsburg; hand spikes, 1.75c to 1.80c, Pittsburg.

Steel.—The first actual instance of importation of foreign steel under the reduced tariff duties and the sold-up condition of the domestic market on semi-finished material, is reported from the eastern coast, where a small lot of basic Bessemer billets from a German maker has just been purchased by a consumer in seaboard territory for early delivery. There is an active inquiry for foreign steel in this country as far west as the Mississippi river, and the reported sale is expected to be the forerunner of other transactions in material from European mills. Prices of steel continue to advance. A substantial tonnage of long-length Bessemer sheet bars for prompt shipment was purchased this week at $29, Pittsburg, and some makers of open-hearth bars, though they are not selling, say they would ask $30, mill. A fair-sized tonnage of standard Bessemer billets was also sold this week at $27, Pittsburg, and some open-hearth billets at the same price. Other sales of Bessemer billets at $26.50, Pittsburg, are reported. Some sellers of semi-finished steel have disposed of all their surplus material this year and decline to name prices for next year's delivery at this time.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $26 to $26.50, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $26 to $26.50, Pittsburg. Forging billets are held at $29 to $30, Pittsburg. Sheet and tin bars are quoted at $28 to $29, Pittsburg.

Hoops and Bands.—Contracts have been made by makers with the large cooperage interests and other principal buyers of hoops, and a steady volume of orders is being received from these sources as well as from the miscellaneous patrons. While the mills are running full, reasonable deliveries can still be obtained. Bands are in strong demand and shipments are far behind. We quote the market as follows:

Hoops in carload lots, 1.50c to 1.60c; in less than carload lots, 1.60c to 1.70c; bands, 1.40c to 1.50c, base with net extras as per standard steel.

Merchant Bars.—Although some makers are adhering to a minimum price of 1.45c, Pittsburg, on steel bars, the 1.40c, Pittsburg, quotation

is still being made in preferred cases although these instances are now less in evidence than they have been. The position of the market appears very strong. Much business for first quarter shipment is being offered and some is being taken at prices ranging from 1.40c to 1.50c, Pittsburg, but the mills with their deferred deliveries are inclined to be conservative in selling for forward shipment. Specifications continue to come to the mills in undiminished volume and deliveries on the standard sizes run from 10 to 12 weeks. On some of the small sizes of bars makers are simply swamped, deliveries having fallen back to five and six months. The bar iron trade is improving, and the Republic Iron & Steel Co. this week started its Toledo mill after an idleness of several years. Some makers decline to sell more than 60 days ahead because of the advancing scrap market. Bar iron sold this week at 1.60c, Pittsburg mill, but some makers want a minimum of 1.65c. The demand for shafting continues unusually brisk and on some of the small sizes the mills are fully six months behind in shipment. We quote the present market as follows:

Common iron bars, 1.60c to 1.65c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c to 1.50c; plow and cultivator, 1.40c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 57 per cent in carloads and 52 per cent in less than carloads, delivered in base territory.

Planished and machine straightened tire is 1.60c base; iron finished tire under 1½ by 1½ inches, 1.55c, both plus ½ extra on tire card; iron finished tire, 1½ x ½ and over, 1.40c, plus net extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100-inch and thicker, we quote base prices for 100 pounds, $3.20 on hard, and $3.45 on soft, except in carload lots of one size where the price is lower.

Structural Material.—Most of the fabricating shops have their capacities engaged for several months and more, and some of them are not so anxious for additional business except where deliveries are convenient and prices satisfactory. In some cases, however, sharp competition is still to be met. The present inquiry for new work is not heavy. The leading interest is not able to make deliveries within several months' time, but some of the independents can get orders for shapes through the mills in from four to six weeks. Selling of shapes into next year is being done on specific contracts at prices of from 1.50c to 1.60c, Pittsburg. The McClintic-Marshall Construction Co. has taken 7,800 tons for the steel work for the platforms of the new terminals of the Michigan Central railroad at Detroit. About 2,500 tons of Bethlehem shapes will be included in this contract, and the remainder of the plain material will be furnished by the Carnegie Steel Co. Some additional steel will be required for the new train sheds, the contract for which has not been placed. The Fort Pitt Bridge Works, Pittsburg, has taken 2,700 tons for the Olds bank building, Spokane, Wash., for which 2,300 tons of Bethlehem shapes are specified. The American Bridge Co. will furnish 1,000 tons for a warehouse for the American Sugar Refining Co., at New Orleans, and Wm. B. Scaife & Sons Co., Pittsburg, will fabricate 625 tons for a new mine tipple of the Isabella-Connellsville Coke Co. We quote shape prices as follows:

Beams and channels, 15-inch and under, 1.50c to 1.60c; over 15 inches, 1.60c to 1.70c; zees, 1.50c to 1.60c; tees, 1.50c to 1.60c; angles, from 3 to 6 inches, 1.50c to 1.60c; over 6 inches, 1.60c to 1.70c; universal and sheared plates, 6¼ inches wide and wider, 1.50c to 1.60c.

Merchant Pipe.—Many of the mills have their capacities heavily booked on some sizes, so that it is difficult to secure a full order of any assortment from one maker. Quick deliveries on some sizes are however obtainable and the market in this respect is not so congested as in some other finished lines. Some makers decline to sell more than 30 days ahead at present prices. Pipe line construction is fairly active in some sections but no inquiries of importance are appearing. Some iron pipe makers are quoting inside prices of 74 and 5, which is $2 over the prices of other mills. We quote the following official discounts on merchant pipe, subject to an additional one point and five off to jobbers.

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	71	55	66	..
⅜ inch	72	58	67	53
½ inch	75	63	70	58
¾ to 6 inch.....	79	69	74	64
7 to 12 inch.....	74	59	69	52
PLUGGED AND REAMED.				
1 to 4 inch.....	77	67	72	62
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	64	52	59	47
½ to 4 inch.....	71	59	56	54
4½ to 8 inch.....	67	55	62	50
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	60	49	55	44

Boiler Tubes.—Improvement continues to be noted in the tube market and there is greater buying by locomotive and merchant users, principally the former. Some of the mills are however still in need of tonnage and can make deliveries very promptly. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch.....	49
1¾ to 2¼ inch.....	61
2½ inch	63
2¾ to 5 inch	69
6 to 13 inch	60

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	43
1¾ to 2¼ inch.....	43
2½ inch	48
2¾ to 5 inch.....	55
6 to 13 inch.....	43

Wire Products.—A very fair fall movement to the consuming trade in wire products is under way, although the jobbers are carrying full stocks and are not specifying so freely with makers. The manufacturing users are however calling upon the mills for heavy shipments, and some difficulty is being encountered in filling their needs with the current tonnage. Prices in wire products are firm and further advances soon would not be surprising to the trade. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to retailers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—The true market level on rods is not easy to determine, as some makers are declining to sell and others are obtaining fancy prices. Sentimentally, however, the market seems quotable at from $32 to $33, Pittsburg, on Bessemer and open-hearth rods.

Cut Nails.—An advance of 10 cents per 100-pound keg has been announced by the makers of cut nails, making the new prices 1.85c, Pittsburg, on large lots, and 1.90c, Pittsburg, on small lots. The mills have full capacities booked for weeks ahead and the market is one of strength.

Coke.—The market in coke has recovered somewhat from the excitable state into which it was thrown by the recent rapid advance, and, while less

feverish, is still very strong. The quieter aspect is due to the fact that some large consumers have covered for their needs and withdrawn from the market, although there are a number of important furnace interests which are expected to close in the near future for their needs, aggregating several hundred thousand tons. One large Pennsylvania steel company has been buying large blocks of coke for delivery through 1910, and is reported to have contracted for from 25,000 to 50,000 tons a month. The contract price for first half seems to have been well settled by recent transactions at $2.90, ovens, but some offerings are being made at $2.85. Spot furnace coke is selling at $2.75 and upward. In foundry coke, a contract for 50 cars for first half at $3.15, ovens, and another for a large block for first half at the same price were closed this week. Some selling at $3.25, ovens, is reported and on extended forward shipment $3.50 has been quoted, but the disposition of large coke makers is to let prices advance in an orderly manner. Spot foundry coke is selling at $3, ovens. No shortage of box cars is reported this week, although some racks were loaded last week. We quote spot furnace coke at from $2.75 to $2.90, ovens, and on contract from $2.85 to $3, ovens. On first class Connellsville foundry coke, we quote at from $2.90 to $3, ovens, for prompt and from $3 to $3.25, ovens, on contract. The *Courier's* figures for the week ending Oct. 2 show 34,693 ovens active, with an output of 423,819 tons, compared with 33,092 active ovens and a production of 418,956 tons the previous week.

Old Material.—The general disposition to hold for higher prices in old material is displayed in the market by both producers and dealers and trouble to either buy or sell is being encountered by middlemen. It is estimated that more tonnage in this district is in the hands of producers asking higher prices than in dealers' yards. Some higher levels are being reached by sales. Wrought scrap has sold at $19.25, delivered, and $19.50 is being asked. Some of the steel works are buying heavy steel around $18, delivered, but sales are not heavy, due to prevailing conditions. Owing to the idle state of much shop equipment for several years past, the supply of cast scrap upon the market is not large and dealings in heavy lots are few. We quote gross tons, delivered, in the Pittsburg district, including Monessen, Sharon, Follansbee, Brackenridge and Steubenville, as follows:

Heavy melting scrap	$17.75 to 18.00
Rerolling rails	18.50 to 19.00
Bundled sheet scrap	16.00 to 16.50
Iron axles	27.50 to 28.00
Old iron rails	19.50 to 20.00
No. 1 wrought scrap	19.00 to 19.50
Old car wheels	17.75 to 18.25
Low phosphorus	21.50 to 22.00
Machine shop turnings	13.00 to 13.50
Cast borings	11.00 to 11.25
No. 1 cast scrap	16.50 to 17.00
Malleable	16.50 to 17.00
Stove plate	13.25 to 13.75

CHICAGO.

Lull in Buying, but no Evidence of Weakness has Appeared.

Office of THE IRON TRADE REVIEW.
1328 Monadnock Block, Oct. 12.

The past week has been a very quiet one, and it would seem as if both sides of the market—the buying and the selling—were taking stock as to the situation. While there is an unmistakable lull in the market, it would be impossible to put one's finger on any spot, and indicate it as a point of weakness. There have been predictions of tumbling of a top-heavy market, and speculations as to the stability of the present prosperity, and as to how long a forward campaign might be prosecuted with safety, but the confidence of the public seems not to have been shaken, and "times are good," in spite of the gloomy forebodings of the pessimists. A very great percentage of the large buying in all lines, during the recent past, has been for consumption within a comparatively short time, leaving the increasing demand which will be heard from in the nearby weeks and months, to be taken care of when the time arrives. One of the largest interests has so managed its sales, that it has very little fluctuating material on its books that could not be shipped out if the material were available. Sales of pig iron and steel rails have been of only ordinary volume, in the past week. Wire products and merchant pipe and tubes have been in improving request, the volume of business booked having exceeded recent records by a comfortable majority. Jobbers report their business as very heavy and stocks much broken, with scant chance to repair for weeks. One firm states that its business in September was the best it ever had, while the record for October, so far, has been even better.

Pig Iron.—There is nothing near the tonnage being handled in this market which was being put on the books a few weeks ago. Melters have made up the shortages in their earlier purchases, to a very great extent, and while there is considerable inquiry, there is at the same time a very marked hesitancy to rush into the market for future requirements. Foundrymen are of the opinion that $19.35, Chicago, is near the top, and some are playing a waiting game in the expectation of seeing a recession in prices. At the same time, the furnace interests are not exhibiting any desire to come into the market with offers of iron, and are refusing, in some cases, to take on any more business at present prices, or for long-time delivery. The Tennessee Coal, Iron & Railroad Co. again has notified its agents that no more business will be taken until further notice. Among the local inquiries at present in the market is one from a prominent foundry and machine company, which has asked for prices on 16,000 tons of iron, about 10,000 tons of which is No. 2 foundry and the remainder high silicon iron. A large steel-casting interest is said to be in the market for from 5,000 to 7,000 tons of basic, but as this interest is a large buyer of pig iron, the report has no special significance. Some off-grades of iron are said to be selling, to take the place of the high-priced scrap material. There are reports of occasional sales of southern No. 2, at $14.50, Birmingham, which seem reasonably authentic, but the majority of furnaces will not consider anything lower than $15, and not even that price for second quarter of next year. Northern irons are held very strong. Quotations on charcoal have been advanced 50 cents per ton.

Lake Superior charcoal	$20.00 to 20.50
Northern foundry No. 2	19.00 to 19.50
Southern foundry No. 2	19.35
Southern silveries, 5 per cent silicon	20.35 to 20.85
Jackson Co. silveries, 8 per cent.	21.40
Malleable Bessemer	19.50 to 20.00
Alabama basic	18.85 to 19.35

Billets.—Chicago is out of the market, for the present, at least, so far as being a seller of billets is concerned. Whether or not there will be any billets for the market after the 18-inch mill at Gary is started, will depend upon conditions. This mill has not yet been put regularly in operation, because of the unfinished condition of the cooling-beds connected with the mill, but it is expected to be running this week.

Merchant Bars.—Business continues very good, with manufacturers trying to avoid sales which run into 1910 delivery. Owing to the peculiar conditions which enter into the question of delivery, the spread in prices has widened somewhat on bar iron. Customers of good standing are being taken care of, so far as possible, but as a general rule, spot specifications are required. The Great Northern road has bought 1,000 ore cars from the Pressed Steel Car Co. The Lehigh Valley has bought 150 refrigerator and 750 50-tons gondola cars from the Standard Steel Car Co., and 250 50-ton gondolas from the Cambria Steel Co.

We quote for Chicago delivery, as follows:

Bar iron, 1.50c to 1.55c; hard steel bars, 1.50c to 1.55c; soft steel bars and bands, 1.58c to 1.68c, half extras; soft steel angles, less than 3 x 3, 1.63c to 1.68c, half extras; hoops, 1.63c to 1.68c base, full extras; planished or smooth finished tire steel, 1.73c to 1.78c; iron finish, up to 1½ x ½ inch, 1.63c base, tire card; iron finish, 1½ x ½ inch and larger, 1.43c to 1.48c base, steel card; channel for solid rubber tires, ¾ to 1 inch, 2.03c to 2.08c; and 1⅛ inch and larger, 1.93c to 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.53c; toe calk steel, 2.13c; spring steel, 2.18c; crucible spring steel, 2.68c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c, base, full extras; soft steel bars, 1.80c to 1.90c per 100 pounds base, plus full extras; soft steel hoops, 2.30c, full extras.

Structural Material.—While new business has been of smaller volume for the past week or two, there is considerable tonnage open which will be closed in a short time. The situation in the mills is about the same as for some weeks. Quotations made by the leading interest are new subject to immediate acceptance and change without notice. All orders on the corporation's books for steel which is subject to fluctuations of the market are of a spot character and could be shipped at once, if the mills could turn out the material fast enough. New business for the week includes 380 tons for the Saunders building, at San Francisco, taken by the Schrader Iron Works, San Francisco; a business block at Flint, Mich., 449 tons, taken by Bolter & Son, Chicago. The Dearborn Foundry Co., Chicago, was awarded the contract for three small buildings for the Chicago, Rock Island & Pacific railroad, amounting to 51 tons. Plans are now in the market for the new bridge at St. Louis, recently mentioned, and bids will be taken about Nov. 1. The specifications call for nickel steel. Plans for the Mohawk building, at southeast corner of Dearborn and Monroe streets, Chicago, will be ready in about ten days. The amount of steel required will be about 2,000 tons.

We quote mill prices for structural shapes, Chicago delivery, as follows: Beams and channels, 15-inch and under, 1.68c to 1.78c. For extras see Pittsburg report.

Local store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.90 per 100 pounds; angles over 6 inches, $2 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds base; channels, 3 inches and larger, $1.90 per 100 pounds base.

Rails and Track Supplies.—Sales of steel rails have not been large during the past week, but it is understood that the Pennsylvania is in the market for a large tonnage and that the Illinois Central soon will have to make purchases of rails. Since last report, about 30,000 tons of standard rails have been sold by the Illinois Steel Co., of which 20,000 tons were open-hearth and the remainder, Bessemer. Track bolts are scarce and somewhat stiffer in price.

See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26.00; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12 pound, $28. In lots of 250 to 500 tons a reduction of 60c a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.80c to 1.90c; smaller size spikes, 1.85c to 1.90c base; track bolts with square nuts, 2.25c to 2.50c, base; with hexagon nuts, 2.40c to 2.65c.

Plates.—Mills are very well sold up, but are making no effort to extend business. Prices are very firmly held and show a wider spread, according to varying conditions.

We quote, for Chicago delivery, as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.68c to 1.78c. For extras see Pittsburg report. Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier up to 72 inches wide, 1.90c to 2.00c; from 72 inches wide to 96 inches wide, 2.00c to 2.10c; 3/16-inch up to and including 60 inches wide, 2.00c to 2.10c; 72 inches, 2.25c to 2.35c; No. 8 up to 60 inches wide, 2.05c to 2.15c. Flange and head quality, 25c extra.

Sheets.—A fair demand is reported for sheets for this year's delivery, and there is said to be some selling for next year, although no selling movement has been established as yet The Inland Steel Co. is asking $2 per ton above current quotations for first quarter's delivery.

For mill prices see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.65c to 2.75c; Nos. 22-24, 2.70c to 2.80c; No. 26, 2.75c to 2.85c; No. 27, 2.80c to 2.90c; No. 28, 2.90c to 3c; No. 30, 3.15c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 and 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.40c; No. 26, 3.50c to 3.60c; No. 27, 3.70c to 3.80c; No. 28, 3.90c to 4c; No. 30, 4.30c to 4.40c.

Wire Products.—October business has been very heavy, coming from all lines, and most of the business is new, and not specifications on old contracts. All contracts are for 60 days.

We quote, Chicago delivery, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers', less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers', carload lots, $2.03, with 30c for galvanizing; plain wire to jobbers, carload lots, $1.78; staples, $1.98.

Merchant Pipe and Tubes.—A good business is going, especially in merchant tubes, for which the demand is better than for some time. The call for locomotive boiler tubes from railroads is very heavy. The effect of the advance recently made in prices seems to have been discounted and no decrease in the volume of business is apparent.

For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛-inch to ¼-inch, 68 per cent; ⅜-inch, 69 per cent; ½-inch, 72 per cent; ¾-inch to 6-inch, 76 per cent; 7-inch to 12-inch, 71 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¾-inch to 5-inch, 58 to 60 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 48 to 50 per cent; seamless steel tubes, 2¾-inch to 4-inch, 47½ per cent.

Cast Iron Pipe.—A few small orders are being booked in this line, but nothing heavy is in the market at present. It is expected that the yearly contracts from gas companies and municipalities will be making their appearance soon. The United States Cast Iron Pipe & Foundry Co sold 500 tons to Terrace Park, O., near Cincinnati. Lettings will be made soon at Newark, O., for 750 tons, and at Bradford, O., for 250 tons.

We quote as follows. 4-inch water pipe, $28.50; 6 to 14 inches, $27.50;

larger sizes, $26.50; gas pipe, $1 a ton higher.

Old Materials.—Steadily maintained prices still characterize this market and the consumption of scrap is keeping pace with the general increase in activity in every line.

We quote, gross tons, as follows:

Old car wheels	$18.50 to 19.00
Old iron rails	20.50 to 21.50
Rerolling rails (4 ft. and over)	18.00 to 18.50
Old steel rails (2 ft. and under)	18.00 to 18.50
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	23.50 to 24.50
Frogs, switches and guards	16.75 to 17.25
Heavy melting steel	16.50 to 17.00
Shoveling steel	15.75 to 16.25

We quote, net tons, as follows:

No. 1 R. R. wrought	$16.00 to 16.50
No. 2 R. R. wrought	14.75 to 15.25
Arch bars and transoms	18.50 to 19.00
Knuckles, couplers and springs	15.50 to 16.00
Shafting	17.50 to 18.00
Iron car axles	21.50 to 21.75
Steel car axles	20.00 to 20.50
Locomotive tires	17.00 to 17.50
Dealers' forge	13.50 to 14.00
Pipes and flues	12.25 to 12.50
No. 1 cast, 150 lbs. and less	15.50 to 16.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.25 to 10.75
No. 1 boiler cut	11.50 to 12.00
Boiler punchings	15.00 to 15.50
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	11.00 to 11.50
Railroad malleable	15.50 to 16.00
Agricultural malleable	13.50 to 14.00
Stove plate and light cast scrap	13.00 to 13.50
Ang'e bars splices, etc. (iron)	18.25 to 18.75

CLEVELAND.

Scarcity of Bessemer Ore—Inquiries for Steel Making Pig Iron.

Office of THE IRON TRADE REVIEW,
Browning Building, Oct. 12.

Iron Ore.—It is impossible to buy Bessemer ore, and the outlook is that some furnaces will run short before navigation opens next spring. The demand for all grades of ore has been so active that some piles which have been on hand for a number of years and could not be sold even in 1907, on account of being low grade ore, have been disposed of. There is a scramble for dock space, which is extremely scarce. The mines in the Lake Superior district are mining ore more rapidly than it can be cared for by the railroads, and a car shortage is causing considerable delay in the movement. It seems probable now that some allotments of ore may be made early in December, but nothing definite has yet been done.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi Non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—Inquiries for large tonnages of Bessemer and for considerable quantities of basic are pending in a more or less formal way from large independent interests. One company has sold 4,000 tons of Bessemer for November delivery at $18.50 furnace, and a like amount for December delivery at $18.75. The former price is now the minimum, while some are holding for $19. There is a strong feeling in some quarters that although the inquiry for foundry iron is now only fair, it is bound to improve. Owing to the very active demand for Bessemer, as many furnaces as could possibly be put on that grade are making Bessemer, and with the increased melt of foundry iron which is confidently anticipated, the supply of foundry grades is not expected to exceed the demand, if indeed it equals it. On the other hand, it is pointed out that toward spring some furnaces now on Bessemer may be compelled to go on other grades, on account of not having enough Bessemer ore. We quote for prompt delivery in Cleveland as follows:

No. 1 foundry	$ 18.75
No. 2 foundry	18.25
No. 3 foundry	17.75
No. 2 southern	18.85
Gray forge	16.90 to 17.15
Bessemer	19.40
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—No important transactions are reported in this district, but prices continue firm. We quote, Connellsville furnace coke at $2.75 to $2.90 for prompt and $2.90 to $3 for first half of next year. We quote Connellsville foundry at $2.90 to $3.15 for prompt and $3 to $3.25 for first half.

Finished Material.—Some contracting is being done for first quarter, and in few instances, for first half, but mills are not seeking contracts, which are being entered into very conservatively. On steel bars, 1.45c Pittsburg now seems to be the minimum, while some interests are asking as high as 1.55c. On plates, it seems probable that the contracting for first quarter will not be at less than 1.55c and for second quarter at less than 1.60c. Bar iron shows improvement, and somewhat higher prices are being obtained by Cleveland mills.

Old Material.—The inquiry for cast and stove plate continues rather active and the demand can scarcely be met locally. The local market is rather quiet, but prices remain firm and will probably continue so, although there are small chances of immediate increases. Quotations remain practically unchanged, and are, per gross ton, f. o. b. Cleveland, as follows.

Old iron rails	$21.00 to 21.50
Old steel rails (under 6 feet)	17.50 to 18.00
Old car wheels	18.50 to 19.00
Old steel boiler plate	15.00 to 15.50
Malleable Iron (railroad)	18.00 0to 18.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	16.00 to 16.50
Heavy steel	17.50 to 18.00
Country mixed steel	14.50 to 15.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$17.00 to 17.50
No. 1 busheling	14.25 to 14.75
No. 1 machine cast	15.50 to 16.00
Axle turnings	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Grate bars	12.50 to 13.00
Pipes and flues	13.00 to 13.50
Tank iron	12.00 to 12.50
Sheet iron	7.00 to 8.000
Wrought drilling	11.00 to 11.50
Stove plate	13.00 to 13.50
Cast borings	9.50 to 10.00

NEW YORK.

Pig Iron Much More Quiet—Structural Contracts Let or Pending.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Oct. 12.

Pig Iron.—The local market has assumed a decidedly more quiet tone. Aside from one block of 9,000 tons of foundry grades under inquiry from a railway equipment concern, no important tonnages are before the trade, and the run of small orders is also more limited. There is no recession in prices, however, and the situation is as strong as ever, it being realized that a slackening up from the terrific pace of the past two months was inevitable. Considerable charcoal inquiry has come out during the week and a part of it has been closed; the minimum is now apparently $20.50, Buffalo. Aggressive efforts are being made by certain import houses to bring in British iron, and some success is reported, the iron being sold at seaboard, duty paid, just above the $17.00 level. Cleveland warrants are lower, reflecting an extensive profit-taking movement, and this may lead to further shipments to this country. We note some further selling of central Pennsylvania low phosphorus iron at $18.00, furnace, for the remainder of the year. Reports from New England are that considerable business has been done there during the week, but that the beginning of the current week showed the activity shifting to the west. We quote, delivery at New York tidewater over the remainder of the year, as follows:

Northern foundry No. 1	$19.25 to 19.75
No. 2X foundry	18.75 to 19.25
No. 2 plain	18.25 to 18.75
No. 2 southern foundry	18.75 to 19.25
Malleable	19.00 to 19.50
Gray forge	17.25 to 17.75

Ferro-Alloys.—On 50 per cent ferrosilicon the current quotation is $63.00, Pittsburg, and about 200 tons of inquiry is pending, 150 tons in one lot. The lowest seller of ferro-manganese in this market has advanced during

the week and $45.00, seaboard, now appears to be the minimum for future delivery. For this year, however, $42.50 to $43 can still be done. Inquiries aggregate between 1,000 and 1,200 tons, largely in one block.

Finished Materials.—In a limited way a number of interests are now contracting for the first quarter, eliminating such lines as are in bad shape as regards deliveries, but this departure is by no means universal, as several makers of plates, shapes and bars have not yet opened their books. Early shipment on structural shapes is increasingly difficult to secure, and as high as 1.70c, Pittsburg, is being paid for three or four weeks' delivery on sizes taking no extras. Fabricated prices continue low, and little improvement is looked for in the early future, as current business is very light and all efforts are now being centered on catching up with present contracts.

About 2,000 tons of steel will shortly be placed by Edward Corning & Co., for a local apartment house; 1,300 tons is involved in the contractors' letting next Friday on a garage for the Auto Club of America, on 54th street; a 400-ton court house is shortly to be awarded at Hackensack, N. J., and bids have gone in on the Staten Island viaduct, 800 tons. Other pending propositions include the South Brooklyn pier shed, 1,500 tons; the Interboro inquiry, 3,500 tons; the Fidelity building at Baltimore, 2,500 tons; and the Richmond viaduct.

The Michigan Central has awarded 4,200 tons of bridge work at Detroit to the McClintic-Marshall Construction Co.; W. B. Scaife & Co. have taken the 600-ton steel head frame for the Isabella-Connellsville Coke Co.; the Brooklyn Grade Crossing Commission has placed a 250-ton order with the American Bridge Co.; and the Liquid Carbonic Co., at Chicago, has given 700 tons to the Central States Bridge Co.

The billet situation is unchanged and deliveries are still remote, with old contracts far behind. Bar iron is available for early shipment. Some additional rail inquiry from Latin America is expected. We quote, New York delivery, as follows.

Angles, 3 to 6 inches x ¼ inch and heavier, 1.66c to 1.86c; beams, 3 to 15 inches, 1.66c to 1.86c; tees, 3 x ¼ inch and heavier, 1.66c to 1.86c; plates, carload, tank, 1.66c to 1.86c; marine boiler, 2.06c to 2.16c; bar iron, 1.55c to 1.60c; soft steel bars, 1.56c to 1.66c; sheets, No. 28, black, 2.46c.

Cast Iron Pipe.—New York City advertises a contractors' letting Oct. 13 on 1,200 tons of high pressure pipe, principally 12-inch. Prices are higher, as reflected by the Cambridge letting last week, none of the bids being below $23.00, foundry. The leading interest was low, only about 220 tons being involved.

Old Materials.—Prices show little change and the situation continues firm, with stores in this district very small. A steel works outside the association has purchased about 15,000 tons of heavy melting steel at an average only slightly above $18.00, delivered. We quote, New York delivery, prices which dealers will pay, as follows:

Old steel rails (rerolling)	16.00 to 16.50
Relaying rails	19.00 to 19.50
Old car wheels	14.50 to 15.00
Old iron car axles	22.00 to 23.00
Old steel car axles	20.50 to 21.00
Heavy melting steel	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	15.00 to 15.50
Wrought pipe	14.50 to 15.00
Cast borings	10.00 to 10.50
Wrought turnings	11.50 to 12.00
Heavy cut scrap	14.00 to 14.50
Railroad malleable	14.00 to 14.50
Stove plate	11.50 to 12.00
Grate Bars	11.50 to 12.00

CINCINNATI.

Still Possible to Buy Spot Iron at $14.50—Moderate Sales Made.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Oct. 12.

Pig Iron.—The market during the past week has not been lacking in interest and there have been moderate sales. There is a slight revival in the way of inquiry for foundry iron and heavy tonnages of basic are under consideration. In St. Louis territory, an inquiry is calling for from 5,000 to 15,000 tons of basic for deliveries commencing in November and extending to March, 1910. Another inquiry from Chicago territory is for 10,000 tons of basic for first quarter delivery. There is an inquiry for 500 tons of malleable for this year and 2,000 tons for first quarter of next year from a Northern Ohio melter. An Indiana manufacturer is in the market for 1,200 tons of analysis iron for first half of 1910. A railroad company is inquiring for 600 tons of foundry iron for October-November delivery. A northern Ohio melter is inquiring for 425 tons of foundry iron for delivery commencing at once and extending into next year. A sale of 500 tons of gray forge is reported for first quarter delivery to an Ohio engine builder at $13.75, Birmingham. An Indiana melter has purchased 500 tons of foundry iron at $15.00, Birmingham, for first half delivery. A central Ohio manufacturer bought 1,000 tons of foundry iron during the week which was quoted upon from the valleys and the Ironton district. From reliable sources it has been ascertained that $17.50, Ironton, was the lowest quotation made by furnaces in that district, which is regarded as practically establishing that figure as a quotation for the southern Ohio group of producers. It has been stated, however, in the trade that one of the producers in the Ironton district has taken some tonnage on a less basis than $17.50 for No. 2. One of the leading producers in the south has opened its books for the first half of 1910 on the basis of $15.00, Birmingham, but will not make this quotation on second quarter alone; and will only make this price covering tonnage for first and second quarters. This would indicate that $15.00, Birmingham, is an acceptable basis for southern iron for the first half of the year. While there is considerable unsold tonnage in the south for first quarter and first half delivery, it is believed in the trade that the firmness with which iron is being held by the southern Ohio producers and the amount of tonnage booked by the latter furnaces will have a tendency to hold southern Ohio iron to a basis of about $17.50 to $18.00, Ironton; and under these conditions the $15.00, Birmingham, quotation could be more readily maintained than if the northern metal was obtainable on a lower basis than now seems likely. In other words, if the spread between northern and southern iron remains at $2.50 to $3.00 a ton, the southern iron can be marketed in considerable of the central western territory. At present $15.00, Birmingham, for first quarter delivery appears to be firmly established and some producers are quoting $15.00 for the remainder of the year, but there is a moderate tonnage of spot iron and near-by shipment pressing the market at $14.50, Birmingham. We quote for prompt shipment and for delivery over the remainder of the year delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$18.25 to 18.75
Southern foundry No. 2	17.75 to 18.25
Southern foundry No. 3	17.25 to 17.75
Southern foundry No. 4	16.75 to 17.25
Southern No. 1 soft	18.25 to 18.75
Southern No. 2 soft	17.75 to 18.25
Southern gray forge	16.75 to 17.00
Northern No. 1 foundry	17.70 to 18.70
Northern No. 2 foundry	17.20 to 18.20
Northern No. 3 foundry	16.70 to 17.70
Jackson county 6 per cent silicon	18.70 to 19.20
Jackson county 8 per cent silicon	19.70 to 20.20
Jackson county 10 per cent silicon	20.70 to 21.20

Finished Material.—There is no improvement in mill deliveries and specifications are heavy. Premiums are being paid for deliveries in ad-

vance of the usual mill promises. Jobbers' stocks are being depleted by urgent calls for immediate delivery of material. Some steel bars have been sold for next year's delivery on the basis of 1.50c, Pittsburg, although 1.45c, Pittsburg, is the usual price.

Coke.—The market continues strong with ovens extremely independent and prices have been further advanced. Furnace contracts have been placed to a large extent, but there is still some foundry contracting for first half of next year. The business through the offices of selling agents is mainly in spot coke. One of the large producers has notified its selling agents that shipments on contracts will not be made in excess of the estimated requirements given at the time the contract was entered into. Some consumers have been calling for coke in excess of the estimated requirements specified at the time of making contract and it is thought likely that other producers may take similar action which would have a tendency to further strengthen prompt shipment coke. Prices in the leading coke producing districts are as follows:

	Prompt shipment.	Remainder of year.	First half 1910.
Connellsville district:			
Fdy. coke.	$3.00 to 3.25	$3.15 to 3.25	$3.00 to 3.40
Fur. coke.	2.85 to 3.00	2.85 to 3.00	3.00 to 3.10
Wise county district:			
Fdy. coke.	2.75	2.75	3.00 to 3.50
Fur. coke.	2.25 to 2.35	2.25 to 2.35	2.35 to 2.50
Pocahontas district:			
Fdy. coke.	2.75	2.50	2.75 to 3.00
Fur. coke.	2.50	2.50	2.50 to 2.75

Old Material.—The market is firm, with an upward tendency, and some dealers are asking rather extravagent advances above the recognized level of market prices. There is an active call for scrap on contract and a good general demand with dealers in the market quite generally for old material to place on existing contracts. Country scrap is eagerly sought and purchasing agents of large plants and railroads are fully aware of the conditions prevailing in the market and are demanding full prices for old material on sale. In some instances dealers are taking profits on accumulated stocks and replacing such stocks with new purchases. Quotations remain about the same as a week ago.

Old No. 1 R. R. wrought, net tons	$14.50 to 15.00
No. 1 machinery, net tons	14.50 to 15.00
No. 1 busheling, net tons	14.00 to 14.50
Old iron rails, gross tons	15.00 to 16.00
Old steel rails (re-rolling) gross tons	14.50 to 15.00
Old short lengths, gross tons	14.00 to 14.50
O'd iron axles net tons	17.00 to 17.50
Heavy melting scrap, gross tons	15.00 to 15.50
Stove plate, net tons	11.00 to 11.50
Heavy turnings, net	9.50 to 10.00
Cast borings, net tons	8.25 to 8.75
Car wheels	15.50 to 16.00

Bellefonte, Pa., furnace will blow in when repairs are completed.

PHILADELPHIA.

Pig Iron Sellers Report Busy Week —Crop Ends Coming from Europe.

Oct. 12.

Pig Iron.—The eastern Pennsylvania market, after a fortnight of comparative quiet, has taken on renewed activity. By some selling interests the past week is reported as one of the best in months, while a steady stream of inquiry continues to develop from practically all lines of consumption. The sales of one large distributor for the first 10 days of October were fully equal to those of an average month, and it is only the oversold condition of certain producers that prevents this report being general. Basic iron has shared generously in the renewed activity. The Steel Corporation has taken on lots of 1,000 and 3,000 tons for the Pencoyd works, and steel mills in this district have closed for blocks of 4,000, 5,000 and 12,000 tons, making the aggregate a very fair figure. These sales were at $18, delivered, for shipment over the remainder of the year and for the most part at $18.50 for the first quarter. They have cleaned up substantially all the iron available for 1909 delivery, and the tonnage remaining unsold for the first quarter is small. The Pennsylvania railroad has taken bids on from 3,700 to 5,400 tons of foundry for the first half, principally high grade iron, and the Baltimore & Ohio is in the market for a small tonnage. Puddle mills have bought rather heavily during the week, pipe works have taken such tonnages of low grade irons as were offered, malleable foundries have bought both malleable and charcoal iron, and from other classes of melters a brisk demand has come. The market has been full of reports that certain eastern Pennsylvania furnaces have been making concessions of 50 cents from the usual asking prices, but these are apparently without substantiation, as the situation shows no loss of strength. The week has also produced the usual crop of importation rumors, and there is reason to believe one cargo of Middlesboro iron has been engaged for a pipe interest in this section. Marshall furnace is to blow in shortly. We quote, delivery at eastern Pennsylvania plants over the remainder of the year and through the first quarter, as follows:

No. 1X foundry	$19.000 to 20.00
No. 2X foundry	18.50 to 19.50
No. 2 plain	18.00 to 19.00
Standard gray forge	17.25 to 17.75
Basic	18.50 to 19.00
Low phosphorus	21.50 to 22.50
No. 2 Birmingham	19.50 to 20.00
No. 2X Virginia	18.75 to 19.25
No. 2 plain Vigrinia	18.75 to 19.25

Coke.—Furnace interests continue to remain out of the market, relying upon the closing of navigation on the lakes to divert sufficient labor to the coke regions to bring down prices. Moderate sales of foundry coke are being made at $3, ovens, for first half contracts. We quote, local delivery on prompt coke, as follows: Connellsville furnace, $4.90 to $5; foundry, $5 to $5.10.

Finished Materials.—The structural market is as featureless as anywhere in the east. The Penn Bridge Co. has secured a 300-ton contract for a highway bridge for the Northampton & Lehigh Gas Co., the only letting reported with the exception of a 100-ton laundry building at Richmond, taken by the Bethlehem Steel Co. A fair tonnage will be required for the Harriet Lane home, in Baltimore; the general contract is held by the Noel Construction Co., and the steel contract by Hittaffer & Co., of that city. Mercy hospital, also at Baltimore, will require 600 tons and may come out shortly. A small garage at Staunton, Va., is also under negotiation. Bids have gone in on the Harrisburg schoolhouse. In plain materials, mills are sold so well ahead that early deliveries are hard to secure. The billet situation is unchanged. We quote: Structural shapes and plates, 1.65c to 1.85c; steel bars, 1.60c to 1.70c; refined bar iron, 1.55c to 1.65c; sheets, Nos. 18 to 20, 2.50c. Finished materials are not expected to reach much higher levels in the near future, as British shapes are now selling at close to a 1c basis and any further advance of importance might lead to importations.

Old Materials.—The steamer Winnie is due from England with a cargo of Middlesboro crop ends running between 4,000 and 5,000 tons, and another good lot of crop ends has been contracted for in the Netherlands. The material coming in from the gulf ports is principally yard wrought. There is a good demand for rolling mill scrap, and several lines are higher, notably turnings and borings. Heavy steel is relatively quiet at unchanged prices, recent sales of fair sized lots having been made all the way from $18.10 to $18.50. We quote, gross tons, delivery at eastern Pennsylvania plants, as follows:

Old steel rails (rerolling)	$18.75 to 19.25
No. 1 steel scrap	18.25 to 18.50
Old steel axles	23.50 to 24.50
Old iron axles	28.00 to 29.00
Old iron rails	21.00 to 22.00
Old car wheels	17.50 to 18.00
Choice scrap R. R. No. 1 wrought	21.00 to 21.50

No. 1 yard scrap	19.00 to 19.50
Machinery scrap	17.00 to 17.50
Low phosphorus scrap	22.00 to 22.50
Wrought iron pipe	17.50 to 18.00
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	15.50 to 16.00
Axle turnings, heavy	16.50 to 17.00
Cast borings	13.50 to 14.00
Stove plate	14.50 to 15.00

ST. LOUIS.

Sale of 5,000 Tons of Basic and Inquiry for 15,000 Tons is Pending.

Oct. 12.

Pig Iron.—Centennial Week in St. Louis, ending Saturday, Oct. 9, put a temporary damper on the pig iron industry, but dealers believe the veil will be lifted within a few days, and are also confident that the outlook for next year is remarkably good. Sales totaling 4,000 to 5,000 tons of foundry grades are reported to have been made during the week, mostly in car lots, and one inquiry was received Saturday for 15,000 tons of basic for delivery beginning Nov. 1, and extending to April 1. This probably will be closed within a few days. The inquiry is for 10,000 tons, with privilege of increasing it to 15,000, but dealers assert positively that nothing bordering on an option will be considered. A sale of 5,000 tons of basic for remainder of this year and first quarter of next was made today.

Several small orders are reported to have been turned down where shipment was to have been made over the first half of next year, dealers insisting that they dare not sell for longer delivery than the first quarter.

Occasionally one hears of a $14.50 price for No. 2, Birmingham basis, but it is extremely doubtful if any such iron could be found in the St. Louis territory, except possibly for spot iron. Half a dozen of the largest interests interviewed today asserted that $15 was the minimum for any delivery. One sale aggregating 1,000 tons of No. 2 was made last week for first half delivery. Another large interest sold 500 tons of Lake Superior charcoal iron, for first half delivery, in addition to several carload lots.

Our quotation on No. 2 southern, for prompt delivery, to which the freight of $3.75 from Birmingham has been aded, follows:

No. 1 southern	$18.75 to 19 25
No. 2 southern	18.25 to 18.75
No. 3 southern	17.75 to 18.25
No. 4 southern	17.25 to 17.75

Coke.—There is a difference of opinion in the St. Louis territory about the price of coke. One of the largest interests insists that the minimum figure on 72-hour Connellsville foundry coke is $3 for early delivery and from $3.25 to $3.50 on contract for first half delivery, and that one sale was made at $3.30 last week. Other firms in the St. Louis territory assert that the price should be $2.75 and $3 for remainder of the year and first quarter shipment, respectively. Connellsville 48-hour furnace coke is offered at $2.25 to $2.75, some insisting that $2.75 is the best that can be done for any delivery before July 1. West Virginia coke is quoted at 25 cents less than Connellsville. The price on by-product remains unchanged at $5.50 for foundry grades.

Old Material.—The scrap iron market remains firm at the following prices:

Cast iron borings, free from foreign material, net tons	$ 5.50 to 6.25
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	18.00 to 19.00
Iron railroad axles, net tons	20.00 to 21.00
Miscellaneous steel scrap, gross tons	11.00 to 12.00
Old car wheels, gross tons	15.50 to 16.50
No. 1 railroad cast scrap, net tons	12.50 to 13.50
Heavy machinery cast, net tons	14.00 to 14.25
Stove plate and light cast, net tons	10.00 to 11.00
Sheet iron, net tons, uncut	5.00 to 5.50
No. 1 railroad wrought, net tons	13.00 to 13.50
Railroad malleable net tons	13.00 to 13.50
Heavy melting steel, net tons	12.00 to 13.00
Relaying rails, net tons	18.00 to 19.00
Extra heavy cast, regular breaking	12.00 to 13.00
Railroad grate bars (eng)	10.50 to 11.00

BIRMINGHAM.

First Quarter Market Firm—Concessions on Prompt Iron.

Birmingham, Ala., Oct. 12.—The pig iron market is firm at $15 for first quarter. Some re-sale iron is offered at slight concessions for spot deliveries. Merchant iron in small quantities is available for last quarter at $14.50 for No. 2, Birmingham. Inquiry is good, but a tendency to feel the market is manifest.

Coke.—By the recent lighting of the ovens of the Tennessee Coal, Iron & R. R. Co., at Blocton, Ala., the output of coke has been materially increased, but the status of the market is unaffected. The commercial interests are inclined toward higher prices and are not disposed to enter contracts only under especial conditions.

Coal.—The output gradually increases and railroad companies are experiencing considerable difficulty in furnishing sufficient equipment for the movement. Several additional coal companies have recently been organized and new openings are to be made in one or more well established veins.

Old Material.—From the standpoint of the dealer, the condition of the old material market is very satisfactory. A ready demand is found for practically all grades offered, and the fact that premium prices have not been received is due largely to the inability to furnish such quantities as are required. The price of machinery scrap has been advanced, but with that exception the quotations published in last report are believed to correctly represent values. A number of comparatively small lots have changed hands since last report, but no significant tonnages have been offered dealers for some weeks. We quote dealers' asking prices as follows, per gross ton, f. o. b. cars, here:

Old iron axles	$19.00 to 19.50
Old iron rails	17.50 to 18.00
Old steel axles	17.00 to 17.50
No. 1 R. R. wrought	14.00 to 14.50
No. 2 R. R. wrought	12.00 to 12.50
Old steel rails	12.50 to 13.00
No. 1 machinery	12.00 to 12.50
No. 1 steel	12.00 to 12.50
Old standard car wheels	14.00 to 14.50
Light castings, stove plates	10.00 to 10.50
Cast borings	6.00 to 6.50

BRITISH IRON MARKET.

Despite Rumors, One Export Sale is Reported.

Office of THE IRON TRADE REVIEW, Prince's Chambers Corporation St., Birmingham, England, Oct. 2.

A better tone continues to add encouragement to the pig iron market, although no large number of sales have transpired during the week. An advance of 9d in Cleveland pig iron was noted. No. 3 now selling at 52s 6d ($12.84) compared with 51s 9d ($12.66) a week ago. The demand for hematite is better. In the Midland district, pig iron makers are well sold forward, but are chary of taking on large tonnages, rather cutting down tonnage on some orders. The amount in Connal's stores is increasing, today's report being 313,104 tons. In the Midlands, while the market continues strong, yet no change in price has occurred.

While rumors of pig iron exportation to the United States are plentiful, the only transaction reported is for 4,000 tons said to have been made to a firm of importers at Providence, R. I. Sales of spiegel and ferro-manganese by the Tees makers to United States buyers are said to run betewen 40,000 and 50,000 tons.

Addressed Foundrymen.—The October meeting of the Philadelphia Foundrymen's Association was held on the evening of Oct. 6, at the Manufacturers' Club. The meeting was addressed by E. H. Mumford, president of the E. H. Mumford Co., of Philadelphia, on "Jolt-Ramming Machines and Foundry Methods Involved."

METAL MARKETS.

ST. LOUIS.

Oct. 11.

Lead and Zinc.—Zinc blende brought a top price in the Missouri-Kansas-Oklahoma district last week of $52 a ton on an assay base of $49 for 60 per cent grades, with one carload bringing a basic price of $49.50.

Spelter went to $5.87½, an increase of 2½ points over the preceding week, but in spite of this the demand for zinc was not unusually heavy. The surplus ore in the district is estimated at more than 7,000 tons. Much of this is in camps centrally located. The output continues to increase because of the development of new properties and the resumption of work in many of the old ones.

Lead brought a high price of $56 a ton, an increase of $1 over the prevailing price of the preceding week, and a decline of $2 from the top price of the preceding week. St. Louis pig lead was quote Saturday at $4.27½. Calamine sold for $22 base price for 40 per cent grades.

The New York spelter market is reported to be at a depressingly low ebb, and nearly all of the business that is transacting is in the western market.

CHICAGO.

Oct. 12.

New Metals.—There has been an increased demand, and in spite of the heavy increase in the stocks of copper, no concession in prices has been made. Spelter has made quite an advance, and sheet zinc was put up on Oct. 11. Some inquiry for future delivery was in the market during the week.

We quote as follows: Lake copper, carload lots, 13½c to 13⅝c; casting copper, 13c to 13⅛c; smaller lots, ¼c to ¾c higher. Spelter, 6.00c to 6.05c; lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.75 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 31¾c to 32¼c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Scrap material has been scarce, and is commanding a price beyond its actual value. This has had the effect of turning some purchasers toward the new metal, between which and old metal the spread has narrowed.

We quote dealers' selling prices, as follows: Copper wire, 13c; heavy copper, 12¾c; light copper, 11¼c; heavy red brass, 11¾c; heavy yellow brass, 9¼c; light brass, 6½c; No. 1 red brass borings, 9¾c; No. 1 yellow brass borings, 7½c; brass clippings, 9¼c; tea lead, 3.60c; lead scrap, 4c; zinc, 4½c; tin pipe, 29c; tin foil, 27c; pewter, 20c; electrotype plates, free from wood, 4¼c; electrotype dross, 2.75c; streotype plates, 4½c; stereotype dross, 3.50c; prime slab zinc dross, $70 per ton.

NEW YORK.

Oct. 12.

Copper.—Following the publication of the Copper Producers' Association report on Monday, showing a heavy increase in stocks and showing the record-breaking output during September, the market assumed a decidedly weaker tone both on this side of the Atlantic and abroad. The tenor of the report had been anticipated, however, and the break was hardly as sharp as would otherwise have been the case. Current trading is light and is on the basis of 13c to 13⅛c for Lake, 12⅝c to 12⅞c for electrolytic and 12½c to 12⅝c for casting. The New York Metal Exchange was closed Tuesday. The Copper Producers' Association report was as follows:

	Pounds.	
Stock of marketable copper of all kinds on hand at all points in the United States, Sept. 1, 1909..		135,632,565
Production of marketable copper in the United States from all domestic and foreign sources during September, 1909.....		118,023,139
Deliveries of marketable copper for consumption and export during September, 1909		102,182,932
Stock of marketable copper of all kinds on hand at all points in the United States, Oct. 1, 1909.		151,472,772
Deliveries:—		
Domestic consumption.	52,105,155	
Export	50,077,777	
		102,182,932

Pig Tin.—The market is somewhat less active and the metal is being offered more freely, with considerable pressure to sell spot and nearby tin. The foreign position is also weaker. Current business is on the basis of 30c to 30¼c for early shipment metal.

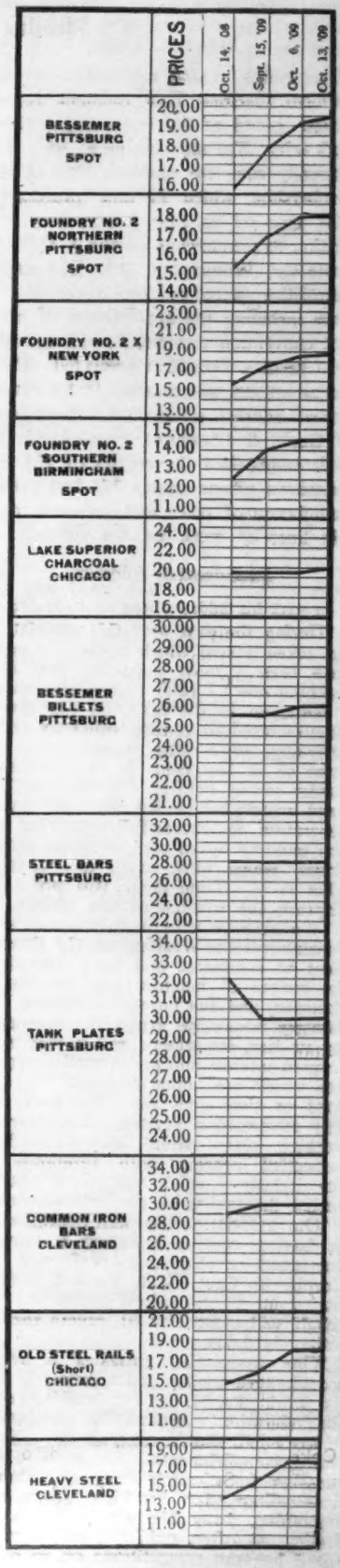
Pig Lead.—On a quiet and rather featureless market, prices have undergone little change and we quote, New York delivery, at 4.32c to 4.37c.

Spelter.—The situation has lost none of its strength and the minimum is apparently 5.90c, for New York delivery.

Antimony.—Cookson's, 8⅜c to 8⅝c; Hallett's, 8c to 8⅜c; ordinary brands, 7⅝c to 7⅞c.

The Philadelphia offices of Hickman, Williams & Co. have been removed to 710-11 Pennsylvania building.

PRICE CHART.



NATIONAL MACHINE TOOL BUILDERS' CONVENTION

The Standardization of Machine Tool Motors and the Creation of Machinists Discussed at the Eighth Annual Meeting of this Association, Held in New York City

The eighth annual convention of the National Machine Tool Builders' Association opened at the Hotel Astor, New York city, Tuesday morning, with an unusually complete representation of its membership, which is now practically 100. One of its first actions was the election to membership of the J. Morton Poole Co., Wilmington, Del. The usual formalities were quickly disposed of, these including the appointment of several convention committees, and the official reports were then presented. Particular interest was attached to the presidential address of Fred L. Eberhardt, of Gould & Eberhardt, Newark, N. J., as it emphasized the results of the association's efforts during his two years' incumbency of office and indicated certain lines of work for the future.

Presidential Address.

In part his address was as follows:

"During the past year this association has taken a step which to me seems to have been a most important and far-reaching one. I refer to our advocating a reduction in the tariff on our goods manufactured in foreign countries; thus reversing, to a large extent, what to some of us had come to be considered almost second nature, in a more or less fixed custom which has prevailed for a generation in successfully carrying on and building up so many business enterprises, which have made this country what it is. Time alone will prove or disprove the wisdom of this charge.

"We have brought to the attention of the authorities at Washington, the department of commerce and labor, including the bureau of manufactures, bureau of statistics, and the bureau of census, the industry which we represent, emphasizing its size, importance and needs; have aroused interest and set in motion activities which are bound to work for our good as time goes on. We have not only advocated a revision of the metal-working classification, but obtained a respectful hearing with reference to our industry, which will show results during the taking of our next census.

"Our association has been instrumental in having continued during this year, the good work being performed in Europe by Capt. G. L. Carden, United States R. C. S., whose work in our behalf will cease Dec. 31, unless further action is taken.

"Our association provides a wider acquaintance among manufacturers, and its work stands, if for nothing else, for 'education.' Around this one word, to my mind, should cling all our efforts and accomplishments. It provides the occasion for clearing away any misunderstandings, for breaking down and smoothing away the many forms of feeling so often exhibited and experienced between competitors; or, in other words, to better understand the other fellow. It also strives to educate and uplift the ideas of manufacturers of machinery, as to the various fundamental elements of cost that they should be careful to include; the many items of expense which actually exist, but do not appear on the surface and are often overlooked by so many, especially beginners, and not infrequently by those of longer experience. The history of the past two years will prove to every thoughtful manufacturer the truth of this statement.

"Six months ago we only *believed* the trade corner of the recent business depression had been passed; today we are sure of it.

"I suggest that each committee, not already so working, seriously consider and adopt maximum dimensions for the various essential parts of a machine of given size."

Standard Machine Tool Motors.

The matter of perhaps the greatest importance at the morning session was the presentation of its report by a committee appointed a year ago to consider the standardizing of electric motors, as applied to machine tools. The report was presented by P. E. Montanus, Springfield Machine Tool Co., in the absence of his son, Paul A. Montanus, chairman of the committee, the other members being B. B. Quillen, Cincinnati Planer Co., and John LeBlond, R. K. LeBlond Machine Tool Co. The report was emphasized as purely a preliminary one, covering the results obtained from a meeting held about the first of the year with the American Association of Motor Manufacturers, who are endeavoring to become more familiar with machine tool motor requirements in order to put on the market a new type of motor to fit these needs, and from a circular letter sent out under date of Sept. 14, asking the views of the members on several specific questions, replies being received from only about one-third. Liberal quotations from this report are given below:

The first question asked was: If all the manufacturers of motors were to make their base dimensions and other important dimensions alike for a given horsepower, would it not be beneficial to all? The question brought the unanimous answer of "Yes."

Question No. 2, regarding the tolerances of 1/32-inch variation of printed dimensions, brought 84 per cent of the answers in favor of such a tolerance; 16 per cent required exact dimensions.

With regard to question No. 3, whether shaft should be standard, or plus, or minus a thousand, 63 per cent were in favor of standard; 23 per cent required a thousand above; 14 per cent a thousand below; while one manufacturer recommended that the smaller motors should be a thousand above size, and as shaft increased the number of thousand above standard should also be increased.

This committee asked that the association as a whole impress the importance of these three first questions upon the manufacturers of motors, as they are of great help to the manufacturers of machine tools and are the three questions upon which all can agree.

The attention of the association has been called to a few motor manufacturers who core the base holes instead of drilling the same, and it is urgently recommended that the base holes be drilled from a template, which template should be interchangeable among the various motor manufacturers for a given horsepower, and furthermore that the shaft be placed in the motor so that it shall be parallel to the base, as we have heard several criticisms on this last mentioned point.

Regarding questions 4 and 5, which refer to the maximum speed of motors, both constant and variable, and also to the peripheral speed of gears, the committee finds quite a diversity of opinion. From the report we find that for constant speed work the majority seem to favor 1,200 revolutions per minute on most of the smaller motors, at least up to five horsepower.

There was, however, a difference ranging from 900 to 1,800 revolutions per minute. Where rawhide pinion is used it was found that the maximum speed was somewhat higher, but that still 1,200 revolutions per minute was most commonly used. With metal pinion this was somewhat lower.

It is with respect to the speed of motors and their variations, we found the greatest difficulty at the joint meeting with the Electrical Association. The speeds were so arranged and based on the following suggestions: That the starting basis of constant speed of the A. C. current, 60 cycles be used as the basis of the D. C. constant speed motors, and also that this be used as a basis for the working out of the variable speed requirements. These speeds were suggested as follows: 600, 720, 900, 1,200 and 1,800 revolutions per minute.

These figures are not absolutely the correct ones for the above condition, but are approximately close enough for discussion purposes. In all the speed tabulation it is understood that the variation of 5 per cent up or down be allowed.

Discussion of Report.

The presentation of this report was followed by considerable discussion, the chief basis of which was the belief on the part of several members that the maximum speed should not exceed 1,000 revolutions per minute. The efforts of the association along this line some five

years ago were reviewed, the lack of success at that time being due largely to the absence of an organization among the motor manufacturers. The latter are to have a meeting in November and some definite action is anticipated at that time. After a number had spoken on this report it was returned to the committee for the further consideration of the subject, with the instructions that work along this direction be continued.

Ten minutes time was then given to a representative of the all-American exposition to be held at Berlin, May to July next, when 100,000 square feet of display space will be available for American manufacturers. The project has the endorsement of the bureau of manufactures, and its purpose was fully explained.

Creation of Machinists.

Under this subject a profitable discussion of a half hour was spent, emphasis being laid upon means for providing a more adequate supply of skilled labor. As it was put by E. P. Bullard Jr., one of the principal speakers, "During the past two years your efforts have been to get business; in the coming years the great work will be to get men." He told of the two systems recommended by the association's apprenticeship committee, one providing for the handling of general apprentices and the other for the instruction of special apprentices, the latter being taught one branch of the trade only and reaching proficiency in that particular branch within a comparatively short time. Mr. Bullard pointed out that even the general apprentices in the long run were bound to become specialists on some one class of work. He urged the importance of paying the boys sufficiently attractive wages to keep them contented and also of going out after older men and giving them living wages during their term of apprenticeship. Another member had the following to say of apprenticeship methods employed at his plant:

"A few years ago we found that we were unable to obtain boys as apprentices, for the reason that they could get better pay in other trades, such as shoe factories, tobacco factories, tanneries, dry goods and other stores, and this caused us to raise the hourly rate, which was originally 5 cents to 8 cents. But at that time we were allowed to use boys between the ages of 14 and 16 years. Since then a law has been passed in Ohio prohibiting boys working more than eight hours, under 16 years of age; and in order to comply with this law, we discharged all boys who were under 16 years. We then found, speaking for our own company, that in order to get a sufficient supply, the rate must again be raised from 8 cents to 9 cents per hour.

"Simultaneously with this difficulty, came the great activity among the builders of automobiles. This occurred during the time that business was very dull in the machine tool line. When business became active once more, having the addresses of all of the machinists who were formerly employed by us, and having sent to each one a letter, stating that he could return to work, we were surprised to find almost no responses; and we then saw that we should be obliged to go into the creation of machinists on rather a large scale. Advertising in the daily and trade papers brought comparatively no results. We then decided to rearrange our work and divide it into very much smaller items than heretofore, arranging the parts so that they could be machined with the greatest possible simplicity, and then set about inquiring for men, not machinists, and an advertisement like the following was put in the daily papers:

WANTED.—Young men between the age of 20 and 30 years. Fair wages and good opportunities for advancement. Men accustomed to safe-making or carriage-making preferred.

"The first day following this advertisement we obtained 12 out of possibly 30 applicants. They were selected largely because of their former experience, and somewhat upon their personality, personal appearance and address. These 12 men we placed, one in each of the 12 departments, with instructions to the foremen of the pieces they should be taught to produce. We found that by this method the first installment of 12 were readily assimilated, so that within one month we were ready for another similar lot.

"Now to give you some idea of how we proceeded in the matter. We arranged with a first class machinist who has been with us a long time to go from one man to another, see how he was performing his part of the work, set him right when he was wrong, and give him further explanations after an additional piece was added to the work he had already been taught. This involved the installment of some new tools and in the beginning, a slower production; but as these young men became better acquainted with the work, we advanced them from 15 cents to 17½ cents per hour, and some of them to 20 cents per hour, and it does appear as though quite a number of them, within a very short time, may be advanced to 22½ cents, from that to 25 cents and so on. As this advance takes place, they will of course have been taught how to turn out additional pieces.

"Strict orders should be given to all foremen and superintendents to use every endeavor to retain any man who wants to leave, or anyone they are inclined to discharge. This is of the utmost importance, as otherwise it keeps a regular stream of men coming into the plant and leaving it unless special care is taken. It is not to be expected that we can create machinists in a short space of time without giving the method of doing it a great deal of care, and unless the man was a drunkard, or had an exceedingly bad disposition, good treatment and a sufficient amount of tact and patience will retain a great many who are otherwise discharged."

Closing Session.

The session of Tuesday afternoon was given up to routine matters. On Wednesday morning a general discussion was held on two important plans of industrial education, that in force at the University of Cincinnati being outlined by Fred A. Geier, and the Fitchburg plan being explained and its success pointed out by M. A. Coolidge. Dr. W. H. Tolman, director of the Museum of Safety and Sanitation, delivered a stereoptical lecture on "The Perils of Peace for a Safer America." In the afternoon, at the concluding session, J. P. H. Perry, of the Turner Construction Co., spoke on "Reinforced Concrete Construction From the Machine Tool Industry Standpoint," his address also being illustrated by stereopticon lecture.

The election of officers was scheduled for the late afternoon. Rochester is apparently certain of securing the next convention.

RECORD BREAKING

By the Steel Companies—Corporation Rail Sales.

(Special Telegram.)

New York, Oct. 13.—A continuation of present activities means that the United States Steel Corporation records will practically all be broken during October, while independent interests will also establish many new records.

The Corporation mills announce total rail sales of 95,000 tons. Including the Missouri Pacific order, about 42,000 was taken by the Illinois Steel Co., and 53,000 by the Carnegie Steel Co. The New York Central inquiry is still pending.

HEAVY SALES OF BASIC IN EASTERN TERRITORY.

(Special Telegram.)

New York, Oct. 13.—Although quiet in limited districts, the eastern market as a whole is decidedly more active, one large selling interest reporting the past seven days as the heaviest in its history and the prospective business as even better. Basic sales have been at least 40,000 tons. The market is featured by the brisk buying of steel making materials by plants which are themselves producers, by a pronounced scarcity of pipe-making grades and by the confidence with which large melters are buying for the first half. Only two cargoes of foreign iron are definitely known to have been arranged for. One goes to Boston and the other to a pipe plant near Philadelphia.

ALL VESSELS BUSY

And Ore Movement Heavy—Annual Meeting of American Ship Building Co.

Lake trade was never firmer than it is at present. There is work for every vessel and even small carriers that have gone into ordinary have been fitted out again for the fall trade. Ore shippers have so dominated the market that for a spell last week it was impossible to get a single carrier for grain. It is several years since such a condition has existed on the lakes and is quite significant considering the very large additions that have been made to lake tonnage during the past five years. Ore shippers are moving all the ore that they possibly can and are bent upon equalling or exceeding the record of 1907. During the past two days, weather conditions have operated to render the movement of ore difficult. Wild weather in the upper lake district sent several of the large carriers to shelter, many vessels are consequently overdue, and little work was done at upper lake docks as the pockets were filled with ore waiting for carriers. Westerly winds also lowered the water at the Limekiln Crossing so that many of the larger carriers were unable to cross. Obviously this has contributed to reduce the capacity of the fleet materially and to make the demand for tonnage keener than ever. The season is closing most hopefully and the outlook for next year is most promising.

A new record was established in the loading of the steamer Corey at Two Harbors on Sunday last, when 10,111 gross tons of Pioneer ore from the Vermillion range was loaded in 39 minutes. Particulars of this record are not as yet at hand, but the time included all delays and probably embraced one shift of the steamer. The record in part was made possible by the use of the new Summers steel ore cars, which dump their cargo in 45 seconds as against 7½ minutes for the ordinary type of car. It is probable that all of the pockets were loaded and that the cars were standing on top of the pockets waiting to be dumped.

American Ship Building Co. Report.

The annual meeting of the American Ship Building Co. was held at Jersey City on Wednesday, Oct. 13. The financial statement as prepared by the Audit Co. of America shows the balance on hand as of June 30, 1908, to be $6,098,574.23. In the annual statement as prepared by the treasurer of the company, this balance was given as $6,012,557.14, but the note appended to the Audit Company's report explains the difference. Following is the company's statement as of June 30, 1909, as prepared by the Audit Company:

ASSETS.		
Cost of real estate, buildings, machinery and tools, patterns, patents, models, furniture, fixtures, etc., as per books	$17,220,248.57	
Additions for year ending June 30, 1909	83,894.22	
		$17,304,142.79
Sundry bonds and stocks at cost		904,900.00
Materials and supplies, market value		466,937.04
Accounts and Notes Receivable:—		
Notes receivable	$ 1,967,747.94	
Accounts receivable	1,091,096.75	
Accrued on uncompleted contracts	941,382.49	
		$ 4,000,227.18
Cash		823,560.69
		$23,499,767.70
LIABILITIES.		
Capital Stock:—		
Common	$ 7,600,000.00	
Preferred	7,900,000.00	
		$15,500,000.00
Notes and accounts payable		416,871.86
Reserves:—		
For maintenance	$ 500,000.00	
For insurance	181,967.04	
For dividends (payable July 15)	138,250.00	
For sundries (taxes, rents, liability insurance, expenses etc.)	239,026.34	
For contingent earnings on unfinished construction, 1908-9	100,000.00	
		$ 1,159,243.38
Earnings, including $200,000 contingent earnings on unfinished construction, 1907-8 (before deducting maintenance and depreciation)	$ 1,257,722.15	
Less:—		
Preferred dividends	$553,000.00	
Maintenance and depreciation	194,850.63	
Rebuilding docks, etc.	184,793.29	
	932,643.92	
Surplus for the year	325,078.23	
*Balance, June 30, 1908	6,098,574.23	
Surplus, including working capital		$ 6,423,652.46
		$23,499,767.70

Note.—In addition to the foregoing there exists a contingent liability from the guarantee of first mortgage bonds on steamships built by the company, aggregating $1,733,000, and carrying interest.

*In the annual reports of the company possible profit on construction completed shortly before end of each fiscal year, or nearing completion at that date, have not been included in that year's earnings pending active operations of the steamers, possible claims or additional work. The Audit Company has included this profit. R. C. WETMORE, Treasurer.

WILL RELIEVE COMPANIES WITH OUTSIDE CHARTERS.

Harrisburg Oct. 11.—According to officials of the state's financial departments the decision of the state supreme court in the American Steel Hoop Co. tax case will relieve companies with charters from other states which entered this state prior to 1901 from paying state bonus on capital increases. The decision will affect dozens of companies, operating in this state under New Jersey and other charters, as they will not have to pay one third of 1 per cent on all capital increases as contended by the auditor general.

MAY SET SALE ASIDE.

An effort is being made to re-open the recent sale of the properties of the Tidewater Steel Co., Chester, Pa., to Youngstown, O., investors. On petition of David S. B. Chew, representing 1,200 shares of stock, a court rule has been granted to show cause why the receiver's sale should not be set aside, the rule being returnable Oct. 16. The petitioner claims that the sale was not properly advertised and that the property is worth far more than the price received.

BIG CANADIAN CAR MERGER UNDER NEGOTIATION.

Toronto, Can., Oct. 12.—Negotiations are in progress in Montreal for a big merger of car companies, including the Canada Car Co., and the Dominion Car & Foundry Co., of Montreal, and the Rhodes-Curry Co., of Amherst, N. S. The Canada Car Co. is capitalized at $3,000,000 and the Rhodes-Curry Co. at the same amount. The final decision has not been reached, but it is regarded as assured that an amalgamation will be effected.

The Tacoma Wright Wrench Co., of Tacoma, Wash., and Canton, O., which was organized by Allen C. Mason and others to manufacture a line of improved monkey wrenches, has been reorganized under the name of the Wright Wrench Mfg. Co. with headquarters at Canton. The new management is making additions to the plant and is preparing to prosecute vigorously the manufacture and sale of the patent Wright wrenches.

PLANTS CROWDED

In the Baltimore District—New Records Made at Sparrows Point.

Baltimore, Oct. 11.—The importance of Baltimore as an iron and steel center is becoming more apparent every day with the return of better times, and a bright immediate future in all lines of trade is looked for. The larger plants are crowded with work at present, and the smaller foundries and makers of specialties are feeling the impetus of returning prosperity.

The consummation of the deal by which the South Baltimore Steel Car & Fdy. Co., will pass into the control of the Standard Steel Car Co., of Pennsylvania, is expected in a few days. The Standard is purchasing additional ground near the old plant at Curtis bay and a big increase in the scope of the work at that point is looked for. The details of the deal are being withheld as yet, but the transaction will represent about $340,000, the amount for which the creditors bought in the plant about two months ago at a receivers' sale.

The biggest factor in the local trade situation is of course the Maryland Steel Co. works at Sparrows Point, near here, and there has been a splendid improvement in the business there following a long period of inactivity and partially closed plants. The steel plant and the marine department are now working at full capacity. The rail mill is rolling rails as fast as possible, and broke the record last week in the amount of finished product since March, 1907, by rolling 1,636 tons in 24 hours. The steel company has orders for approximately 70,000 tons of steel rails on its books at present, or enough for about two months. Considerable progress is being made on a new openhearth plant which the steel company is building. The furnaces, five in all, are expected to be completed about Feb. 1, and will be put in operation shortly after. This will be four months earlier than was expected. The four blast furnaces last Monday broke the previous high record for making pig iron. The total number of tons made was 1,578, or an average of about 395 tons a furnace. The previous high record was in March, 1907.

The Pennsylvania Steel Co., has received a contract for 41,800 tons of steel rails of the 200,000 tons ordered by the Pennsylvania railroad for next year. It is understood that the Maryland Steel Co. will roll the 41,800 tons. The contract will take a little more than a month to fill.

Foundries out of fuel are finding it harder to close contracts with coal and coke men at the favorable prices that have existed throughout the summer. Bituminous at the mines has advanced from 15 to 25 cents a ton on all grades and coke has had even a greater advance. There are some agents asking $3 for spot coke at ovens, but most shipments are being secured at lower figures.

MERIT ONLY

Will Govern Selection of Census Agents—Statistics of the Iron Trade.

Washington, Oct. 11.—Effort is to be made next year to get the most accurate and most comprehensive statistics regarding the iron and steel business and other branches of manufacturing ever collected during a decennial census. More than 1,600 special agents are to be appointed to collect the facts regarding manufactures, mines and quarries and a large number of them will be detailed to look after the metal trades.

As evidence that the census bureau is determined to get reliable statistics, it is announced that no political appointments of these special agents will be made. They are all to be made upon merit and as the result of a competitive examination to determine the fitness of applicants. This examination will be held on Nov. 3 and the appointments will be made about Jan. 1. The jobs will last from three to 15 months and the pay will range from $3 to $6 per day.

The states or manufacturing localities will be divided into districts, each district to be in charge of a chief special agent, who will have under his direction assistant special agents. In Pennsylvania, the great iron and steel center, there will be 15 of these districts and the men assigned to them for the purpose of collecting data will be specially picked for that work. It is estimated that 220 special agents will be required for Pennsylvania, and for Ohio 145 will be needed. There will be seven districts in Ohio.

By keeping these appointments out of politics and selecting only men who are known to be reliable and capable, the officials of the census bureau believe they will be able to collect statistics concerning all branches of manufacturing that will be accurate and which can be accepted as the basis for any sort of computations or estimates. Fault has been found in the past that the men who were detailed to this work did not give it the care they should but were too much interested in the remuneration. In a number of large cities, this year, including Pittsburg, Cleveland, Cincinnati and Chicago, men have been appointed supervisors who had not the endorsement of the political powers, and in some cases against the opposition of senators and members. But the director of the census has declared it to be his policy to consider nothing in the selection of these men except merit and that he proposes to take the best men he can get regardless of political considerations.

PRATT & WHITNEY CO.'S PLANS FOR EXTENSIONS.

The Pratt & Whitney Co. is maturing plans which will realize $1,250,000 in cash for the company's treasury through the issue of additional securities, according to an announcement from Hartford, Conn. At the same time further announcement was made that two contracts for additions to the company's plants will be let within 60 days. An issue of $2,000,000 of preferred stock will replace the present issue of $1,225,000; and an issue of $2,000,000 will be issued to replace the present $1,525,000 of common stock. The present preferred stock is redeemable at par Jan. 1, 1911, and will be called as planned originally. The new issue of preferred will be redeemable at par Jan. 1, 1921. Its 6 per cent interest will be guaranteed by the Niles-Bement-Pond Co.

EXTENSION PLANS OF JOSEPH T. RYERSON & SON.

Machine tool builders have been very much interested in the confirmation of the rumor that Joseph T. Ryerson & Son of Chicago, will soon enter the field of machine tool manufacture. It is understood that this company will manufacture, in addition to the lighter class of machinery, a full line of heavy machine tools. This arrangement, in connection with the present line, will place the company among the largest factors in the machinery market.

No location has been definitely decided upon, but it is rumored that Cincinnati is favorably considered.

The J. S. McCormick Co., Pittsburg, foundry supplies, has acquired the general foundry supply business of John A. Meighan, 1642 Second avenue, Pittsburg. Possession was taken by the McCormick company Oct. 1.

START MORE FURNACES.

Eastern Pennsylvania Plants are on 1907 Basis.

Harrisburg, Pa., Oct. 11.—Lower Susquehanna valley mills and furnaces are almost without exception back at rates of production which prevailed during the summer of 1907. Production is also increasing in the Lebanon and Schuylkill valleys and numerous orders are reported to have been placed lately. It is probable that two or three furnaces in the latter districts will be put into operation very soon.

The Pennsylvania Steel Co., which recently started up its Bessemer mill at Steelton after two years idleness, is operating the mill on the duplex system, acting with the open hearth mills. The entire plant at Steelton is in full operation.

Bird Coleman furnaces in Lebanon county, are being repaired preparatory to starting shortly.

The Penn Iron Works at Lancaster is reported as operating its puddle department again.

The Fire Proof Wire Co., of York, which is controlled by the Heaney Co., of New York, will enlarge its plant.

Improvements are being rushed at Marshall furnace, Newport, and it will be started in November.

CHARCOAL IRON ADVANCES.

(Special Telegram.)

Grand Rapids, Mich., Oct. 13.—Lake Superior charcoal furnaces have advanced their prices on charcoal iron for next year's delivery 50 cents per ton for the quarter, the schedule for their deliveries being from $20.00 to $20.50 Chicago. Requirements for 1910 are being actively covered, among the contracts closed this week at the above prices being one of 2,000 tons with a malleable foundry in the northwest and another of 1,000 tons with an eastern railroad system.

Arrangements are being made to blow in the furnace at Newberry, Mich., which has been idle some time.

OPEN-HEARTH FURNACE RECORD.

A record for a continuous run made by a small open-hearth furnace is claimed by the Pennsylvania Malleable Co., McKees Rocks, Pa. The No. 5 15-ton furnace of the open-hearth department of that plant was started Nov. 18, 1907, and ran steadily until July 3, 1909, with no repairing except that done to an arch and the jambs in the middle door. The furnace made 701 heats averaging 15 tons each or a grand total of 10,515 tons. Owing to the business depression, the operations of the furnace were restricted and tonnage was lost through one small heat being made a day and sometimes only every other day. In the open-hearth department of the Pennsylvania Malleable Co. the No. 3 furnace has also nearly reached the 500-ton mark. This furnace is expected to have a larger total tonnage output than No. 5 as it makes from 15 to 20 tons to the heat and runs two heats per day.

PERSONAL.

Henry H. Westinghouse, vice president of the Westinghouse Air Brake Co. is now aboard the Mauretania, bound for Europe.

Morris Bachman, president of the Sharon Steel Hoop Co., Sharon, Pa., is seriously ill from a reaction following an attack of typhoid fever.

Leo Mehan, formerly of the Mehan Boiler Co., Lowellville, O., has been appointed assistant superintendent and master mechanic for the Ohio Iron & Steel Co.

Leo G. Smith has resigned as superintendent of the Bucyrus Steel Casting Co., Bucyrus, O., to accept a similar position with the Londonderry Steel Foundry, Londonderry, Nova Scotia.

F. H. Rose, assistant treasurer of the Upson Nut Co., of Cleveland, left Wednesday on a trip around the world. He will be accompanied by Mrs. Rose and will be gone until February.

Severn P. Ker, who has become general manager of the Sharon Steel Hoop Co., was given a complimentary dinner at Pittsburg Saturday by the sales managers of the Republic Iron & Steel Co., with whom he had formerly been associated as general manager of sales.

George E. Gifford has become associated with the S. W. Bowles Co., 314 Madison avenue, New York City, as general manager. Mr. Gifford was formerly with the King Bridge Co., later becoming contracting engineer with Milliken Bros., Inc., with which interest he has served as chief engineer since the receivership.

OBITUARY.

Lewis C. Grover, former president of the Colt Patent Fire Arms Mfg. Co., died in Hartford, Conn., Sept. 30, aged 60 years.

George A. Rollins, president of the Rollins Engine Co., of Nashua, N. H., died at his home in Concord, N. H., Sept. 30, aged 82 years. He was identified for 50 years with the industrial growth of Nashua.

Robert Aitchison, president of the Aitchison Metal Perforating Co., of Chicago, died there Oct. 8, aged 79. With his brother he went to Chicago in 1868 and organized the company of which he was the head.

Zacharias M. Kaufman, of Sheridan, Pa., a native of Leesport, Pa., died on Sept. 25, aged 71 years. Mr. Kaufman was a member of the firm of Wm. M. Kaufman & Co., long engaged in the manufacture of anthracite and charcoal pig iron in the Schuylkill valley.

George W. Willson, aged 55 years, died at his home near Canandaigua, N. Y., Oct. 8. He was born in Manchester, N. Y., and when a young man, went to Pittsburg, engaging in business with Hussey, Binns & Co., shovel manufacturers. Later he attained an interest in the business and served as secretary-treasurer until January, 1909, when he retired because of ill health. Funeral services were held at Pittsburg.

Samuel F. Jevons, who for many years was a well-known member of the Staffordshire iron trade and a regular attendant at the Birmingham Iron Exchange, Birmingham, England, was found dead, Sunday, Sept. 19, on the railway near Bilston. The head was completely severed and the body badly mutilated. Mr. Jevons was a junior member of Thomas Jevons & Son, Ltd., of the Bull's Bridge Iron Works, Moxbridge, near Wednesbury.

Strikers' Wives Angry.—In a set of resolutions adopted Oct. 8, the wives of striking tin mill employes at New Castle, Pa., condemned the Amalgamated Association for failing to pay strike benefits and to call out workmen employed in independent mills. The resolutions have a distinct socialistic tinge in that they declare: "The present strike has taught us painfully the futility of organizations that do not embrace all wage earners in each industry."

The Iron & Steel Products Co., main office No. 80 Broadway, New York City, is operating the Baltimore, Md., Bristol and Lebanon, Pa., rolling mills and chain works full. The company recently booked United States government orders for about 1,000 tons of high grade chains for Panama buoys and light vessel uses.

Prices Yield to High Money Rate

Last week in the stock market was a period of enormous sales and large declines in some issues, especially United States Steel. That stock reached 94⅞ Monday, but Tuesday, when 25,000 shares were suddenly offered, it broke four points. The declining market is ascribed generally to the increasing money rate, both in New York, and in Berlin and London. Vigorous public criticism of those supposed to be manipulating United States Steel probably had a further influence.

Monday, Steel common made up one quarter of the market. Call loans advanced to 4½. Tuesday, Steel common began its decline, and the market was active and feverish, closing lower in almost all the active issues. Call loans rose to 6 per cent. Wednesday the total sales were 1,849,000 shares, of which about one third were United States Steel common, on which the price fell as low as 87½. Thursday, the Bank of England rate was raised from 2½ to 3 per cent, and the market in New York was less active, but still exceeding a million shares, Steel common being the leader. Friday was less active, and closed weak and lower. The government crop report issued that day showed that the yield in grains will be one of the largest in the history of the country. The corn yield will be about 20,000,000 bushels less than last year. Saturday the market was quiet. Steel common was still weak and closed lower.

Money on call averaged 4 to 4½ per cent. Time money was firmer, and quotations were marked up from ¼ to 1 per cent. Bank clearings throughout the United States in the week were estimated at $3,686,738,852, which was about 4½ per cent above the clearings for the week before, and 37.6 per cent higher than for the corresponding period last year. The total clearings in September were 21.6 per cent higher than for September of last year, and exceeded the country's September record by 8 per cent. The actual report of clearing house banks showed surplus increased $5,619,275; loans decreased $49.414,100; deposits decreased $52,489,500, and the ratio of reserve 25.6 per cent against 25.2 per cent the week before. Trust companies and non-member banks showed loans increased $7,869,000; deposits decreased $19,771,600; and the percentage of reserve 17.1, against 17.3 the week before. Exports of gold from New York for the week were $100,000 to Brazil, and imports were $119,589.

Failures during the week numbered 192, against 236 the week before, and 256 the corresponding week last year. For the nine months ending Sept. 30, there were 8,768 failures reported, a decrease of 1,923 from the same period in 1908. The car report shows that during the two weeks ending Sept. 29, there was a decrease of 29,700 in the number of idle cars, which left 28,806 idle cars. The number of shares dealt in on the New York exchange during the week was 5,062,800, against 5,268,400 the week before, and 2,212,562 for the corresponding week last year. Bonds, exclusive of government bonds, valued at $27,942,000, were sold against $27,894,000 the week before, and $18,060,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Oct. 9	Changes in week	Date 1909 Ann.	M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	14¾	— ⅞	Sept.	2	$19,820,000		2½ Q.	
Allis-Chalmers, pr.	53¼	—1⅛			16 150,000	7 cum		Feb., 1904
American Can	12¼	— ¾	Feb.	2	41.233,300		1¾ Q.	
American Can, pr.	82	—2½			41.233 300	7 cum		Oct., 1909
Am. Car & Foundry	69½	— ⅜	June	24	30.000.000		1¼ Q.	Oct., 1909
Am. Car & Fdy., pr.	118⅞	— ⅛			30 000,000	7 n. c.	½ Q.	Oct., 1909
American Loc.	58½	—2⅞	Oct.	19	25.000.000	5	1¼ Q.	Aug., 1908
American Loc. pr.	115¾	— ½			25.000.000	7 cum	1¾ Q.	Oct., 1909
American Ship	67⅛	+1⅛	Oct.	13	7 600.000	4	1¼ Q.	Sept., 1909
American Ship. pr.	110	.....			7,900 000	7 cum	1 Q.	Oct., 1908
Am. Steel Foundries(new)	60⅝	— ⅝	Dec.	2	17.184.000		1¾ Q.	
Barney & Smith	40	+10	June	1	2,000.000	4		Sept., 1907
Barney & Smith, pr.	100	.....			2,500.000	8 cum	1 Q.	June, 1908
Bethlehem Steel	33	—2¾	April	6	14.862.000		2 Q.	
Bethlehem Steel, pr.	68¾	+ ¾			14,908 000	7 n. c.		Feb., 1907
Cambria Steel	46¼	—2¼	March	16	45.000.000*	3	¾ Q.	Aug., 1909
Cambria Iron	46½	+ ½			8.468.000*	4	1½ S. A.	Sept., 1909
Chicago Pneumatic Tool	32	— ½	Feb.	15	6.145,800	4	2 S. A.	Oct., 1907
Colorado Fuel	44	—1⅝	Oct.	18	34.235.500		1 Q.	April, 1902
Crucible Steel	14¼	— ¾	Oct.	20	24.578.400		3½	
Crucible Steel, pr.	82¾	— ⅝			24.436.000	7 cum	1½ Q.	Sept., 1909
Empire Steel	13	+ ½	April	27	1.254.770		1 Q.	
Empire Steel, pr.	72	.....			2.500.000	6 cum		July, 1909
Fay & Egan	90	.....	Feb.	18	1.000.000	7	3 S. A.	Nov., 1908
Fay & Egan, pr.	100	.....			1.000.000	7 cum	1¾ Q.	Aug., 1909
General Electric	164	—3⅜	May	11	65.178.800	8	1½ Q.	Oct., 1909
Harbison-Walker	26½	.....	Jan.	18	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr.	95	.....			9.690.000	6 cum	½	April, 1909
International Pump	47½	—1	June	8	17.762.500		1½ Q.	April, 1905
International Pump, pr.	89	—1¾			11,350.000	6 cum	1	Aug., 1909
Lackawanna Steel	57	+ ⅛	March	10	34.971,400		1½ Q.	
Lake Sup. Corp.	30½	+3⅛	Oct.	6	40.000,000			
New York Air Brake	88	—2	June	17	8.012,500	8		Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500.000	3	2 Q.	Sept., 1909
Niles-Bement-Pond, pr.	100	.....			2,000.000	6 cum	1½ Q.	Aug., 1909
Otis Elevator Co.	57	—1⅛	March	15	6.375,300		1½ Q.	Oct., 1909
Otis Elevator Co., pr.	97	—3			6.295.000	3 n. c.	1½ S. A.	Oct., 1909
Pa. Steel	66	.....	May	10	10.750.000		1½ Q.	
Pa. Steel pr.	117	+ ⅛			16.500 000	7 n. c.		May, 1909
Pittsburg Coal Co.	10¾	— ⅛	March	9	28.104.600		3½ S. A.	
Pittsburg Coal Co., pr.	60¾	+ ⅛			27.071.800	7 n. c.		April, 1905
Pressed Steel Car	46¾	—3¾	Feb.	17	12,500.000		1¾	Aug., 1904
Pressed Steel Car, pr.	105¼	—1⅛			12,500.000	7 n. c.	3	Aug., 1909
Pullman	100¼	— ¾	Nov.	10	100.000.000	8	1¾ Q.	Aug., 1909
Railway Stl. Spring	46¼	—1¾	March	4	13.500.000	2	2 Q.	Oct., 1908
Railway Stl. Spring pr.	105¾	+ ⅛			13,500.000	7 cum	1 S. A.	July, 1909
Rep. Iron & Steel	45¾	—2⅛	Oct.	20	27,191,000			
Rep. Iron & Steel, pr.	106¼	—1¾			20.416.900	7 cum	2½ Q.†	Oct., 1909
Sloss-Sheffield	92	— ¾	March	10	10.000,000	5	2 Q.†	Sept., 1909
Sloss-Sheffield, pr.	110	.....			6.700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy.	31½	—2	June	23	12,500.000	2	1¾ Q.	Dec., 1907
U. S. Pipe & Fdy. pr.	85¾	— ⅛			12,500.000	7 n. c.	½ Q.	Sept., 1908
U. S. Steel	97¼	—5⅝	April	19	508.302,500	3 n. c.	1¾ Q.	Sept., 1909
U. S. Steel, pr.	127	—3¼			360 281.100	7 cum	¾ Q.	Aug., 1909
U. S. Steel, 5s	114¾	.....			463,798.000	5	1¼ Q.	
Va. Iron, Coal & Coke	70	—1	Sept.	21	9.073.680		5 A.	
Westinghouse Elec.	86	—1	June	16	27.173.200	10		Oct., 1907
Westinghouse Air Brake	145	+2	Oct.	5	14.000.000*		2½ Q.	Oct., 1909

Par value of shares, $100, except those starred (*), $50.
†Includes deferred dividend of ¾ of 1 percent.

Copper Stocks.

New York.—Amalgamated copper closed 81⅛, a decrease of 3¼.

Boston.—Butte Coalition closed 24⅞, a decrease of ⅞; Calumet & Arizona closed 100, a decrease of 4; Calumet & Hecla closed 670, unchanged; North Butte Mining closed 62, a gain of ¼; Quincy Mining closed 90, unchanged.

Financial Notes.

The Harbison-Walker Refractories Co. has declared the regular quarterly dividend of 1½ per cent on the preferred stock, payable Oct. 20 to stock of record Oct. 9.

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March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597
September	5,609

October 14, 1909.

RAIL MILL CAPACITY IN THE UNITED STATES.

The people of good old conservative England find it difficult to realize the possibilities of the United States. As an illustration of this fact, an editorial published in a recent number of *The Engineer*, of London, is apropos. *The Engineer*, in discussing the future of the steel rail trade, refers to the recent rapid increase in the number and capacity of steel rail mills in the United States. It estimates that after the completion of the great Gary plant and other plants being planned or constructed, the total steel rail capacity of the United States mills will be between six and one half and seven million tons annually. *The Engineer* then inquires, "Where will the United States find a market to absorb this immense tonnage?" It asserts that an annual demand of six to seven million tons is quite beyond reasonable expectations, and it declares that in order to keep their mills adequately employed, American makers will need an export trade of some three or four million tons per year. *The Engineer* discusses at some length possible users of the American product, and in conclusion says: "That competition in the rail trade from some quarters is likely to be keen, we admit, but we consider that this country, with plants kept efficient, can hold its own before any rival, while we are quite certain that it can easily beat America."

In contrast with the rather gloomy prediction as to the demand for rails made by *The Engineer*, the statements of practical railroad men as to the probable needs of the railroads are extremely interesting. For example, Chairman B. F. Yoakum, of the Rock Island-Frisco system, in a statement made to the *Manufacturers' Record* declares that all the states of the union, except those in New England, need more railroads, and that even in New England vast expenditures will have to be made in the coming year on improvements and betterments, especially for terminal facilities. The great trunk lines and the important local systems will have to be practically rebuilt. Four tracks will probably be as common as double tracks are now, and even six and eight-track lines will be needed. Mr. Yoakum estimates that the central northern section of states will need 50,000 miles of railroads, and the section south of the Ohio and Potomac, and east of the Mississippi, 70,000 miles. He says that the territory west of the Mississippi should have at least twice its present mileage to encourage its proper development. He points out that in the last 25 years the yearly freight tonnage on our railroads has increased 350 per cent, while the facilities for handling it have increased only 86 per cent. In other words, traffic has increased more than four times as fast as railroad facilities. Continuing, Mr. Yoakum says:

"By 1935, with the development of our industries continuing at only the same rate as in the last 25 years, the railroads will be required to move in a day 21,875,000 tons of freight, having a value of $775,625,000. To handle such an enormous volume of traffic, the railroad system would need to be doubled in the extent of its track mileage, and its efficiency would need to be increased in even greater ratio. To build the required new railroad, provide adequate equipment and terminals and improve the existing railroads would call for the expenditure of at least $17,000,000,000 in the next 25 years, or an average annual expenditure of $680,000,000."

With such dazzling figures as these before us, there seems to be no immediate need for worrying about the increase in rail mill capacity, or about the necessity of the United States dumping its steel rails upon other nations. For many years, in other lines of industry, we have heard predictions that the new capacity would soon be far greater than the demand, and this, of course, in times of depression is true, but it has generally been found that, in the long run, the building of new capacity has been profitable. A striking illustration is afforded by the building of steel boats on the lakes, for in spite of the tremendous increase in number and tonnage of lake vessels, the carrying trade is still profitable, and the lake shipyards are extremely busy building more boats. We trust that the editor of *The Engineer* will calm himself and not become unduly alarmed about conditions in this country, or about the possible consequences to other nations of the rashness of the manufacturers of the United States.

THE STEEL CORPORATION'S EARNING POWER.

There is room for doubt whether the advance in the market value of the shares of the United States Steel Corporation has been based wholly upon the change in the probable earning power of the Corporation, but there is no question that the probable earning power has been greatly increased by two influences, the large additions to capacity and the recovery of the iron and steel trade at large from the depression, the

experience including the crucial test of open market conditions in the sale of steel products.

The Corporation has nearly completed its extensive program of improvements. The principal parts of this program were adopted in 1906, chiefly by specific appropriations made Oct. 10 and Dec. 12 of that year. As an index to the program, the principal blast furnace erection may be mentioned, the new furnaces including two at Duquesne, two at Rankin, one at McKeesport, two at Youngstown, one at Lorain and eight at Gary, a total of 16 furnaces.

The steel corporation's output may be briefly traced: In 1902, it made 7,975,530 tons of blast furnace products and 8,033,556 tons of finished products for sale, the latter slightly exceeding the former on account of the use of purchased pig iron, and a smaller excess appeared in 1903; in subsequent years, the excess was in pig iron, varying within the limits of a half million and a million tons. The showing in 1906 and 1907 was as follows:

	1906.	1907.
Blast furnace products	11,267,377	10,819,968
Products for sale.	10,578,433	10,376,742

In January of 1906, the Corporation blew in a new furnace, Mingo No. 4, and in September, another, Joliet No. 4. As its existing furnaces ran full in the year, its capacity at the close may be set down at about 11,500,000 tons. In 1907, it blew in four of the 16-furnace program, two Carrie, one McKeesport and one Lorain. The year's output, however, fell short, on account of the rapid slump in production in November and December. With the improvement of a number of the old furnaces, the Tennessee company acquisition and the practical completion of the remaining 12 furnaces on the new construction program, the Corporation's blast furnace capacity is brought above 15,000,000 tons, but such excess above this figure as may exist can be laid to merchant pig iron, pointing to steel operations of 15,000,000 tons of blast furnace products and 14,000,000 tons of steel products for sale. The additional finishing capacity has not progressed as far as the blast furnace capacity, but completion is in the measurably near future.

As the year 1907 represented the top in the movement of finished steel prices, a comparison of earnings and tonnages in both 1906 and 1907 forms a more acceptable basis than would the single year. The earnings and tonnage of steel products for sale in the two years were as follows:

	1906.	1907.
Earnings	$156,624,273	$160,964,674
Tonhage	10,578,433	10,376,742

The average of the two years represents $15.15 earned per ton of finished product for sale.

Prices promise to rule slightly lower than in 1906-7, but not a great deal lower. Assuming that in the near future steel bars will become established at 1.50c and plates and shapes at 1.60c, it may be noted that bars were 1.50c in 1906 and 1.60c in 1907, plates being 1.60c in 1906 and 1.70c in 1907, while shapes were 1.70c in both years. Wire products are between $3 and $4 per ton below their 1906-7 average. Steel pipe was relatively low in 1906, and requires no great advance to bring it up to the 1906-7 average. Sheets and tin plates are roughly about $4 a ton lower than their 1906-7 average. Standard rails are at unchanged prices, while light rails are only slightly lower than their former average.

Thus the prospect is that with trade conditions continuing favorable, average realized prices will not be much lower than the average of 1906 and 1907. With full employment, moreover, the Steel Corporation stands to decrease the charge per ton for selling expenses, subsidiary company bond interest, taxes, and various other items of expense, which are deducted before the "earnings" are reported. The employes' bonus funds alone promise to show any important increase.

It is probably conservative to estimate the steel corporation's earning power at about $200,000,000 a year, this being almost the exact result of 14,000,000 tons at $14.29 per ton. Conditions may easily be conceived which would justify an increase in this estimate. The trend of late has been towards more product being finished into the higher forms, which command greater profits, and economies are being introduced through improvements to plants.

Earning capacity and prospective earnings are not interchangeable terms, as the opportunity to employ earning power depends upon trade conditions. Wall street, however, is not disposed to follow the curve of demand; that interesting district is continually drawing a tangent to the curve, and running along the tangent. The revival in the steel trade has outdistanced the revival in general business. It may develop that in this movement the steel trade is merely getting its own; that the demand for steel is properly greater, in proportion to general business activity, than formerly, and that on further revival in general business the steel industry will enjoy correspondingly greater activity than at present. It may, on the other hand, be found that the steel trade cannot continue so far ahead of other lines of business and that as they improve further the steel trade will improve less rapidly.

Anxious to Serve.—George Nicholas Ifft, American consul at Nuremberg, Germany, writes THE IRON TRADE REVIEW that there is a very considerable market for a great variety of American goods in Nuremberg, especially in machinery, tools, hardware and plumbers' supplies. Mr. Ifft is anxious to render any possible service that he can to American manufacturers, with whom he will be glad to correspond. He describes Nuremberg as a thoroughly up-to-date, modern city, which is in the market for the best in almost every line. He says that there is no use in anyone wasting time there who is not willing to go after business in earnest, using just such methods as he would use to establish a demand for his product in some particular section of the United States where it had not previously been sold.

Loaded cars handled by the various New York Central lines in September, were 1,720,794, an increase of 275,514 over the corresponding month in 1908, and 97,753 more than for September, 1907.

Bookings of the Sloss-Sheffield Steel & Iron Co., during September, are reported as in excess of 50,000 tons.

AMONG MACHINERY MAKERS.

MILWAUKEE.

The Allis Chalmers Co. Not To Make Ordnance as Reported.

Milwaukee, Wis., Oct. 12.—More reports on the sensational order concerning the future policies of the Allis-Chalmers Co. have been circulated in the daily press during the last two weeks. One report said that the company would enter the competition for government contracts for warship ordnance. C. A. Tupper, of the publicity department of the Allis-Chalmers Co. said, "We have troubles enough of our own without going into government ordnance business".

The Pullman Co., which is building large shops at Pullman, Ill., for the construction of steel passenger cars, has purchased its power plant equipment from Allis-Chalmers Co. of Milwaukee. The equipment consists of two steam turbines and generators aggregating 5,000 horsepower, with condensers, exciters, etc., auxiliary to them.

Fifty-five students of the engineering department of the University of Illinois spent three days in Milwaukee this week studying practical conditions in the large shops. The Allis-Chalmers, Fred M. Prescott Steam Pump Co., West Milwaukee shops of the Milwaukee road, Bucyrus Co. at South Milwaukee, Wisconsin Engine Co., of Corliss, and numerous other plants were inspected.

George W. Morris of Racine, Wis., has invented a new farm tractor especially adapted for plowing. Mr. Morris is working on two large models equipped with 100 horsepower motors, using either gasoline or kerosene and with a drawing power of 4 tons or more.

The Wisconsin Novelty Co. has been organized at Stevens Point, Wis., to manufacture the "Handy Sewing Machine Attachment," a device to be applied to sewing machine transmissions for emery wheels, drills, etc. The attachment is made of cold rolled steel, nickel plated. H. H. Pagel, B. Kane, C. E. Emmons, Dr. M. A. Hadcock, W. E. Kingsbury of Stevens Point and Edward Craig are promoting the company.

Recent orders for steam turbines received by Allis-Chalmers Co., of Milwaukee, aggregate a total of more than 26,000 kilowatt. The improved type of horizontal steam turbine is in great demand, and a large number of "repeat" orders have been received. Among the largest orders are: Nashawena Mills, New Bedford, Mass., two 3,000-kilowatt and one 500-kilowatt unit; Whitman Mills, New Bedford, 2,000-kilowatt; Wilmington (Del.) City Electric Co., 1,500-kilowatt; Paine Lumber Co., Oshkosh, Wis., 1,000 and 500-kilowatt.

The Koerhing Machine Co., of Milwaukee, has started construction work on its new plant, to be located at Thirty-first street and Concordia avenue. The shop, three stories high, will cost $22,000; the office building $2,000 and boiler house $1,000.

PITTSBURG.

Healthy Inquiry Indicates Continued Activity in Heavy Machinery.

Office of THE IRON TRADE REVIEW,
510 Park Building, Oct. 12.

Sellers of machine tools report a healthy inquiry for equipment from the heavy machinery shops which during the past few months have become well filled with work of varied description. Much of the business placed in this territory with the heavy machinery builders has been in connection with extensions and improvements to mill capacities and with the resumption of operations after extended idleness in some cases which showed its effect in the necessity for large replacements. Many of the important shops in this district now have on hand all the work they are able to handle conveniently with present capacities and this is resulting in the enlarging of mechanical equipments.

The structural shops are also showing an encouraging need for additional machinery at this time, as many of them find their present capacities wholly inadequate to turn out the work on hand within reasonable delivery periods. One seller of structural tools reports an inquiry that has averaged fully $1,000 a day over the past month. The present inquiry out appears of the bona fide nature and is expected to shortly develop into numerous sales. The car shops also show an improved condition of trade and are interested in the buying of some additional tools. Makers of pneumatic tools are enjoying a very active market for their product and can no longer assure prompt deliveries. The renewed life in railroad shops is providing them with a steady demand from this class of buyers.

The Standard Tin Plate Co., with a plant at Canonsburg, Pa., has increased its capital stock from $300,000 to $500,000. This company recently increased its manufacturing capacity by the installation of four additional hot tin mills.

The Isabella-Connellsville Coke Co., which is building a new plant in Luzerne township, Fayette county, Pa., continues to award additional contracts in connection with this project. During the week it closed with Wm. B. Scaife & Sons Co., Pittsburg, for the construction of a new steel coal tipple. The structure will require about 625 tons of steel.

The M. E. Kraybill Light, Heat & Power Co., with a capital of $25,000, has been incorporated under the laws of the state of Pennsylvania, with Martin E. Kraybill, of Boiling Springs, Pa., as treasurer.

CINCINNATI.

Railroad Orders are Still Pending—Woodworking Machinery Quiet.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Oct. 12.

The demand for machine tools appears to be fairly well sustained. While the rush of orders is not so great as during the month of August there is steady and regular call for nearly all classes of machines. The heavy types, especially planers, have not had the demand that the lighter lines have enjoyed. The automobile industry is still furnishing the most important source of demand and while the tendency toward more general and distributed inquiry is noticeable, this does not develop as rapidly as it was hoped that it would when the conditions began to show a return to activity. The backwardness of the railroads in placing orders is one feature of the situation. There is an immense amount of machinery to be bought by the railroads and inquiries have been pending for a long time. The specifications are ready, but the orders are held back. When these orders come out the shops will have about all they can do to keep up with the demand. At present a number of the plants are behind with deliveries and the few that are able to make prompt shipments are deliberately pressing their forces and making stock. This is evidence that the outlook is good and that there is confidence in the soundness of the present business activity in the machine tool industry. The shops are still finding difficulty in building up their working forces to the maximum as the automobile and other industrial fields have taken away a large number of

men formerly employed by the machine tool shops. The increasing cost of production of machines is a topic of trade discussion.

The wood-working lines have not yet responded to the activity in the iron and steel-working machinery and business is only of moderate proportions in the plants of the wood-working machinery builders. Boiler makers report a rather quiet condition of trade, although the delayed deliveries on plates is becoming annoying in the hindrance of operations in the boiler yards.

Engine and power installations are not active and the engine builders are receiving but few orders. A number of large installations have been figured upon, but the orders have not been placed or have gone to other centers.

The machine tool shops have added to their shop equipments to a considerable extent in the past two months and new installations are constantly being made.

The Hisey-Wolfe Machine Co. has doubled its capacity in the past few months and has installed a number of new machines. The company is preparing to carry a stock of its drills in order to be in position to make deliveries upon receipt of orders.

The Kern Machine Tool Co. reports that on the first of the year it had 180 machines on the floor and that this stock is down to 12, that the plant is running full time and full force and has orders ahead for sizes not in stock. This plant has made a number of purchases of new machines and is now installing a gear cutter and screw machine.

The S. Obermayer Co. has this week received an order from the United States arsenal at Watertown, Mass., for 12 carloads of facings for October shipment.

BUFFALO.

Snow Steam Pump Works Completes Big Job for Steel Corporation.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Oct. 12.

Prevailing conditions among machinery builders and makers of special machinery, including machine tool manufacturers are generally reported as highly favorable here and throughout the state. This statement is based upon actual reports from various interests situated between Buffalo and the Hudson river. There are a few concerns not running as strong as two years ago, but it would be hard to find any wide-awake interest which is not doing nearly double the business of a year ago. What may be termed special machinery manufacturers, are gathering a harvest of orders and in the majority of cases the business is unsolicited, while there are some who are obliged to turn business away. A big share of the specifications of this class are coming just now from the builders of gasoline engines, automobile and marine and motor car manufacturers. The Pierce and Thomas companies of Buffalo and the Franklin interests of Syracuse are rushing all preparations for 1910 business. In the gear line, the Gleason Works of Rochester are crowded, operating six days and nights, and numerous machine shops are also doing work for this concern. The Ashley Machine Works of Rochester is running full on small specification work. The W. P. Davis Machine Co., of Rochester, is working two shifts in order to meet demand for machine tools. It was learned that this company placed a dozen turret and engine lathes recently and is now building three new sizes of engine lathes, 18-inch, 22-inch, and 26-inch. Here, also, it was learned thaat engine builders are important factors in the strengthened demand for machine tools.

A new gasoline engine manufacturer is equipping a plant at Rochester, N. Y., and will be known as the Hazard Engineering Co., capital stock, $1,000,000. George E. Hazard, formerly with F. O. Brownell Motor Co., Rochester, is vice president and general manager. E. C. Hazard, of Hazard, Coates & Bennett, is president and treasurer, and John Bennett, of Buffalo, secretary. Machinery is now being installed and some operation begun. Both automobile and marine gasoline engines in all sizes will be built. Capacity of plant when complete will be 1,500 engines a year.

T. H. Symington & Co., of Corning, N. Y., have begun the construction of the proposed extensive new plant at Rochester and will soon move the Corning works to Rochester. At Corning, the principal work of the firm is manufacturing railway devices. This business will be carried on at Rochester, but in addition a large malleable iron casting foundry will be built and this will become a leading feature of the enterprise.

The last casting of the order given by the United States Steel Corporation to the Snow Steam Pump Works, Buffalo, for 24 gas engine frames of 115 tons each, has been made and the Snow Works is now engaged in machining and finishing the castings. This piece of business belongs among the world records for size and weight of iron castings The engines were built for installation at the Duquesne and Youngstown plants of the Carnegie Steel Co., and the South Chicago plant of the Illinois Steel Co. All the engines are twin-tandem, double acting of 3,600 horsepower each. Six are being equipped for power service and six fitted with blowing apparatus. The blowing engines weigh about 2,000,000 pounds, but the engines built for power service weigh 300,000 pounds less, the former weighing about 555 pounds per horsepower and the latter 472. The fly-wheels weigh 180,000 pounds each, and had to be made in eight segments. Cylinders are 43 inches in diameter and 60 inches stroke and are made of cast steel. Each half of the cylinder weighs 29,000 pounds. The cranks, two on each shaft, weigh 25,900 pounds, each crank shaft, 100,000 pounds, and the main crossheads 10,600 pounds. In connection with this unusual order it is of interest to note that the gas engine frames were molded and cast in four pits, two 40 feet long, and two 37 feet long, each was 17 feet wide and 10 feet deep.

CLEVELAND.

Machinery Dealers Pushed Hard to Make Deliveries.

Office of THE IRON TRADE REVIEW,
Browning Building, Oct. 12.

Local machinery dealers are not worrying much about booking orders; the greatest worry is how to make deliveries on orders already booked. With shops running at capacity, skilled labor at a premium, and, in some cases, stock piles becoming reduced, the situation is rather problematical.

The demand for small tools, particularly, is insistent, largely on the part of automobile builders, however, Automatic total manufacturers report their order books filled for months ahead, and the same condition exists as far as makers of drop forgings are concerned. Several new building projects are under way, and others are being contemplated.

The Alliance Machine Co., Alliance, O., recently shipped to the Gary plant a 150-ton ladle crane, which is probably the largest of its kind ever built. This crane weighs 450,000 pounds and is one of eight being built by this firm, three being for the Gary plant, three for the Cambria plant, at Johnstown, Pa., and two for the Jones & Laughlin plant at Pittsburg. Another large contract under way in the shops of the Alliance company is the machinery

equipment for the rectangular ovens of the Keystone Coal & Coke Co., at Huron, Pa. The equipment was designed by John W. Seaver, consulting and contracting engineer, Cleveland, and will consist of a coke leveler, having a device for raising and lowering the leveler ladder, coke pusher, and receiving and screening pan for the coke when it is pushed from the ovens.

L. G. Finlay & Co., engineers and contractors, advise that they find a very great improvement along the lines of large machinery. This concern is installing for the Toledo Railways & Light Co., Toledo, O., a plant consisting of two 5-inch, four-stage Jeanesville turbine pumps, direct connected to two 115-horsepower Terry steam turbines. This plant is for boiler feed service, similar to those in use at the Edison plants, in New York and Brooklyn. By means of this installation, the pumping duty will be almost trebled as compared with the original direct acting boiler feed pumps. Other recent installations by this concern consist of one 200-horsepower Terry steam turbine, and one 100-kilowatt Westinghouse high-speed generator for the B. F. Goodrich Co., Akron, O., and a unit for the Deforest Co., Niles, O., consisting of one 150-kilowatt D. C. generator, direct connected to a Terry steam turbine.

The East Iron & Machine Co., Lima, O., advises that during the past month it has made deliveries of its one-car asphalt plant, having a capacity of 4,000 cubic yards of 1-inch binder per day, to the following: The city of San Antonio, Tex.; the Andrews Asphalt Paving Co., Hamilton, O.; the American Asphaltum & Rubber Co., Chicago. This concern is planning for the construction of several new buildings, as the outlook for the coming year is such as to make extension necessary.

The C. O. Bartlett & Snow Co. reports the following recent orders: For the Kelley Island Lime & Transport Co., two elevators having capacities of 600 and 1,000 tons of crushed stone per hour; for the Winding Gulf Colliery Co., Cincinnati, one Greene self-dumping car-haul with complete equipment, capacity 2,500 tons of coal per eight hours; for Wm. A. Clark, Butte, Mont., one ore dryer, and for the American Smelters Securities Co., New York, one ore dryer to be installed at Santa Barbara, Mexico.

The United Steel Co., Canton, O., advises that in addition to two 60-ton open-hearth furnaces recently noted in these columns, it is installing two 75-ton ladle cranes, an electric stripper, five 10-ton cranes, additional gas producers, boilers and other equipment throughout the plant.

The Foos Gas Engine Co., Springfield, advises that its business this year thus far has been heavier by a considerable percentage than during any previous year in its history. This concern has been working its force over time for several months, and recently instituted a night shift with which it is considerably increasing its output.

The Hydraulic Pressed Steel Co. advises that it is installing the largest single-crank double-acting press ever built, weighing about 180,000 pounds. This tool has a 15½-inch crank shaft, and will deliver a blow of 2,000 tons at the rate of eight strokes per minute.

The Parish & Bingham Co., manufacturer of cold pressed steel and metal stampings, advises that it is approximately doubling its capacity, which was good for at least 30,000 frames per year, taking the general run, large and small. Its business is exceedingly heavy at the present time and the outlook for the future is the best.

The Ferro Machine & Foundry Co. has just finished the construction of a large building, containing a model machine shop, dining room for employes, and a large stock room, and has now in course of construction a building to contain a core room, which will be completely equipped in every way with the latest modern labor-saving machinery, and will accommodate from 175 to 200 core makers. This concern advises that its business during the past month has been about 30 per cent better than for the corresponding month last year, and during this time has shipped a large number of engines throughout the United States and Canada, and also to South America and other foreign countries. The company has recently installed the following equipment: One adjustable four-spindle drill, one adjustable two-spindle boring machine, one Norton grinding machine, one Gisholt turret lathe, one Bullard portable turret lathe, one Cincinnati high pressure vertical milling machine, one Windsor piston and ring machine, and two automatic chucking machines. The rapid development of its business makes it necessary for the company to steadily enlarge its plant, and it is therefore at all times in the market for a great many different types of machines.

The Johnson & Jennings Co., iron founder, engineer and machinist, advises that the business of the past month has shown a very satisfactory advance over the preceding month, and is about 20 per cent heavier than that of the corresponding month last year. This concern has been steadily increasing its working force each month for the past four months. Its inquiries for business have been very satisfactory and are continuing so, and the outlook is very gratifying.

The St. Marys Machine Co., St. Marys, O., advises that it is receiving propositions on a 48-inch crank shaft lathe and No. 2 milling machine, and that it has recently installed a new traveling crane over an additional building which is nearing completion. This building will be used for the erection of a new line of heavy tandem gas engines for use with natural or producer gas. This machine is designed according to the latest practice in heavy duty engine construction and was built for the highest compression and highest obtainable economy. Shipments made during the past month by this concern consisted of one 200-horsepower engine, to the Waynesburg (Pa.) Electric Light Co.; one 100-horsepower natural and producer gas engine to Meyer & Schmiesing, Minster, O.; one 90-horsepower natural gas engine to the Little Persimmon Mining Co., Carthage, Mo.; one 90-horsepower natural gas and distillate engine to the Yates Center, (Kans.) Electric Co.; one 35 and one 40-horsepower engine to the Wheelersburg (W. Va.) Milling Co.; one 125 and one 75-horsepower engine to the McConnellsville (O.) Malta Electric Co. The St. Marys company has added about 25 men to its working force during the past month.

The Standard Chain Co., Columbus, has recently installed one of the largest chain testing machines ever built in this country. The new machine has been tested to 635,000 pounds, and will be used to test the strength of the big cable chains used for battleships and other large vessels.

NUMBER OF IDLE CARS RAPIDLY DECREASING.

New York, Oct. 11.—The fortnightly bulletin of the American Railway Association, made public at the close of the week, showed a reduction in surplussage of cars of 53,388, one-third less than the figure reported two weeks earlier. Shortages total 14,582 cars. The surplus is smaller than at any time since the beginning of the depression, and railroads are guarding their cars carefully, declining to apply them toward relieving shortages on connecting lines. The Pennsylvania system now has but 1,800 idle cars, these all being on its western division; on its lines east of Pittsburg, every available car is in use and there is practically none out of service for repairs.

MINING IRON ORE AT WABANA, NEWFOUNDLAND

Description of the Workings of the Nova Scotia Steel & Coal Co., Large Shippers to Eastern Furnaces — Mining Operations Under the Sea

By B. S. Stephenson.

Recent developments in the iron ore situation of eastern Pennsylvania and New Jersey have brought to prominent notice the Wabana workings of the Nova Scotia Steel & Coal Co. on Bell Island, located in Conception Bay, on the east coast of Newfoundland. For several years the United States has been an importer of Wabana ores, usually in unimportant tonnages, but during the last 12 months advantage has been taken of the altered status of eastern furnaces as regards the ore supply to increase this movement heavily. Deliveries during the current year will exceed 200,000 tons, sales for 1910 delivery in this country aggregate 250,000 tons and, with the completion of development work and the improvement of equipment already under way on Bell Island, there is every reason to expect a steady increase in importations from that source. From Wabana to Philadelphia the shipping route is slightly under 1,250 miles and the freight rate averages about $1.00 per ton. As practically all of this ore is received at Philadelphia, the improvements in the ore-handling facilities of the Reading system at that port, fully described in The Iron Trade Review of Sept. 22, are of special importance in this connection.

The Wabana ore is a red hematite, averaging well above 50 per cent in metallic iron, from 7.00 to 8.50 in silica and from 0.08 to 0.10 in phosphorus. At the mines it is crushed to 3½-inch size, which has been found most satisfactory for furnace use, and is hand-picked. Selling on a basis of 7 cents per unit, duty paid at seaboard, it has found a ready demand among both basic and foundry iron manufacturers in eastern Pennsylvania, being handled by Pilling & Crane, Philadelphia. It is sold on a basis of 53 per cent metallic iron and a maximum of 10 per cent silica. Typical analyses, from cargoes recently shipped to Europe and the United States, show the following range:

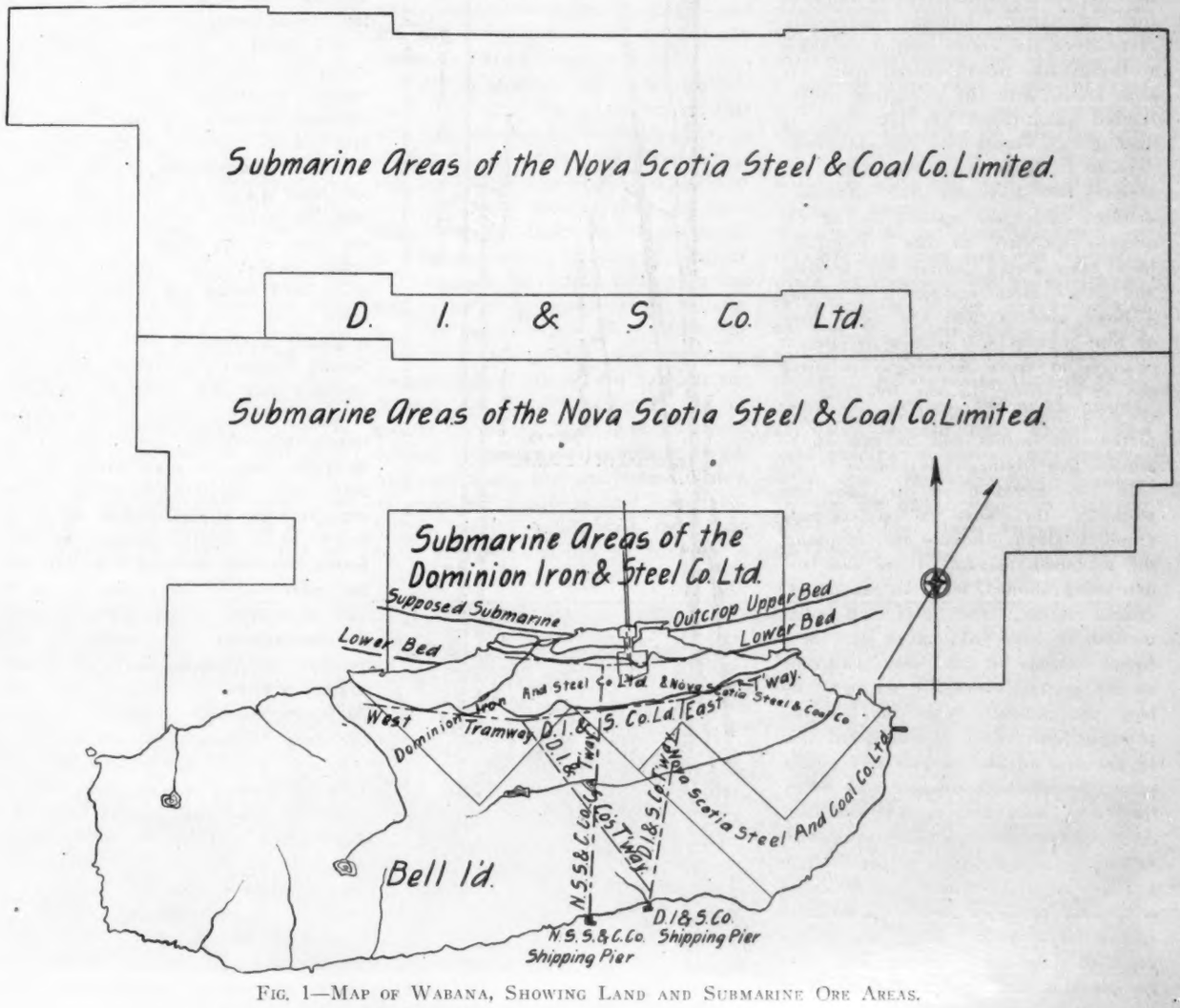

Submarine Areas of the Nova Scotia Steel & Coal Co. Limited.
D. I. & S. Co. Ltd.
Submarine Areas of the Nova Scotia Steel & Coal Co. Limited.
Submarine Areas of the Dominion Iron & Steel Co. Ltd.
Supposed Submarine
Outcrop Upper Bed
Lower Bed
Lower Bed
Dominion Iron And Steel Co Ltd & Nova Scotia Steel & Coal Co T'way.
West
Dominion Tramway
D. I. & S. Co. Ltd East
D.I.&S.Co.Ltd T'way
N.S.S.&C.Co.Ltd T'way
D.I.&S.Co.Ltd T'way
Nova Scotia Steel And Coal Co. Ltd
Bell Id.
N.S.S.&C.Co. Shipping Pier
D.I.&S.Co. Shipping Pier

Fig. 1—Map of Wabana, Showing Land and Submarine Ore Areas.

Metallic iron	52.00 to 53.00
Silica	7.50 to 8.50
Manganese	0.202
Phosphorus	0.80 to 0.90
Aluminum	3.00 to 3.50
Sulphur	0.045
Magnesia	0.202
Lime	2.47
Mo.sture (200 deg. F.)	2.00 to 2.50

The Nova Scotia Steel & Coal Co. operates a 200-ton blast furnace on Wabana ore at Sydney Mines, the requirements of which may be estimated at 150,000 tons per year. For the past five years, ending with 1908, total shipments of this ore have averaged about 320,000 tons, but during the current year this figure will run close to 500,000 tons, as Eastern furnaces in the United States have become customers to the extent of 200,000 tons, and a considerably larger output is anticipated during 1910. Because of the large expenditures already made on these properties, the company has obtained a grant in fee simple on all its areas. The regulations governing the working of mines at this point are similar to those in Cape Breton, where a maximum thickness of cover of 180 feet is required for submarine mining operations. Heretofore the entire output of these workings has been secured from the land areas, with the exception of the limited quantity of ore taken out in driving two slopes into the submarine deposits. These have now been extended to practically the necessary distance and have opened up an enormous quantity of ore. Contracts have been placed abroad for hoisting and other mine equipment involving a large amount, and the next three or four months will witness important changes at these workings, including the enlargement of the buildings at the two slopes. When these are completed, the output can be run up to almost any tonnage desired.

In the operation of its open cut workings, the Nova Scotia company employs steam shovels for stripping, the maximum amount of the over-burden being about 17 feet. In the underground mining, the room and pillar method is employed and it has been found feasible to take out practically all the mineral eventually through robbing the pillars. When this is not possible, however, it is considered that 15 per cent of the mineral left in the pillars is sufficient on land areas where the cover does not exceed 150 feet. As the mineral is brought to the surface by plane haulage, it is put through a No. 7½ Gates crusher by which it is reduced to 3½-inch size. Thence it is transferred to a picking belt and is deposited in stock piles or into cars for transfer directly across the island

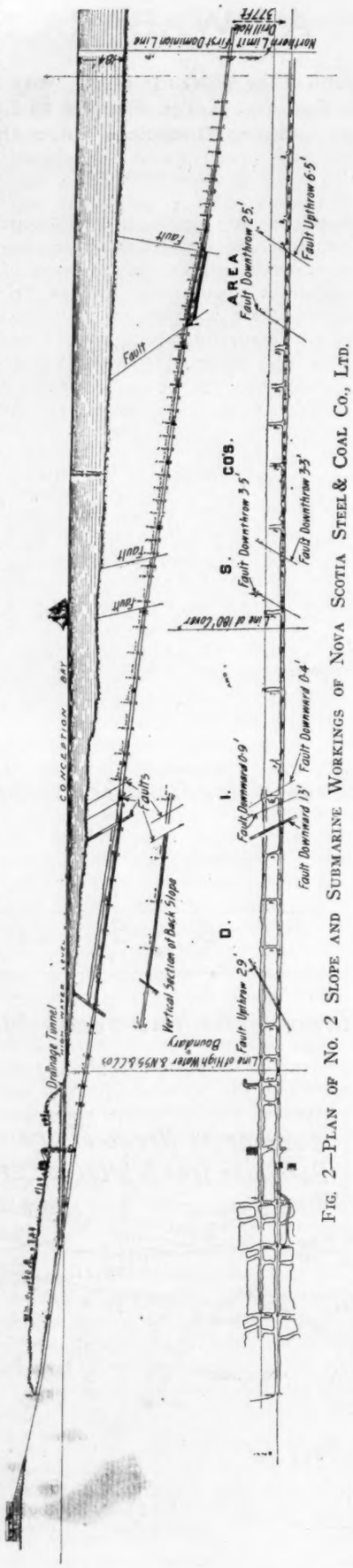


FIG. 2—PLAN OF NO. 2 SLOPE AND SUBMARINE WORKINGS OF NOVA SCOTIA STEEL & COAL CO., LTD.

to the loading docks. This latter is accomplished by a system of endless rope haulage, the distance being about two miles to the shipping piers on the south side of the island. The capacity of this haulage is well over 3,000 tons per ten hours. As the ore reaches its destination it is deposited in a 25,000-ton pocket, constructed in a gorge immediately back of the pier. From this pocket the ore is transferred by gravity to a conveyor, having buckets of 1-ton capacity which operate through a tunnel in the cliff and discharge their burden into a 500-ton loading pocket located at the extreme end of the pier, whence the ore is loaded by gravity into ocean-going vessels. The pier has a low tide depth of 28 feet of water at its extremity and is in a sheltered position; vessels can be loaded in a few hours at any time, except in mid-winter, when the island is liable to be icebound. The slope buildings, some of which are inclined to accommodate the picking belts, the system of haulage across the island, and the loading pier are all shown in the accompanying illustrations.

Bell Island is 7 miles in length and about 2½ miles in width, having an irregular rectangular shape. It has an extreme elevation of only about 200 feet and the character of the rock strata furnishes unmistakable evidence that it has been planed off by glacial action. The ore outcrops at the extreme northern edge of the island, and dips moderately beneath the open bay, giving a grade well suited for economical operation. The entire mineral deposits were originally acquired in 1893 by the Nova Scotia company, by which they were operated until 1898, when the Dominion Iron & Steel Co., Ltd., at its organization, purchased the lower bed of ore upon the land and a submarine area of three miles adjoining the shore. Knowing the ores of the Middle or Scotia bed to be of superior quality, the Nova Scotia company reserved this vein with the intention of using the ore in its own iron works. Subsequently, however, the development of a market for this product in Europe and the United States resulted in its acquiring some 30 square miles of submarine areas to the deep of those sold the Dominion company, which also secured the mineral rights to a limited area well beyond the limit of present operations. The complex nature of the respective properties of the two interests, resulting from these various acquisitions is shown in the accompanying map, Fig. 1.

In order to reach its submarine areas, the Nova Scotia company over three years ago made arrangements with

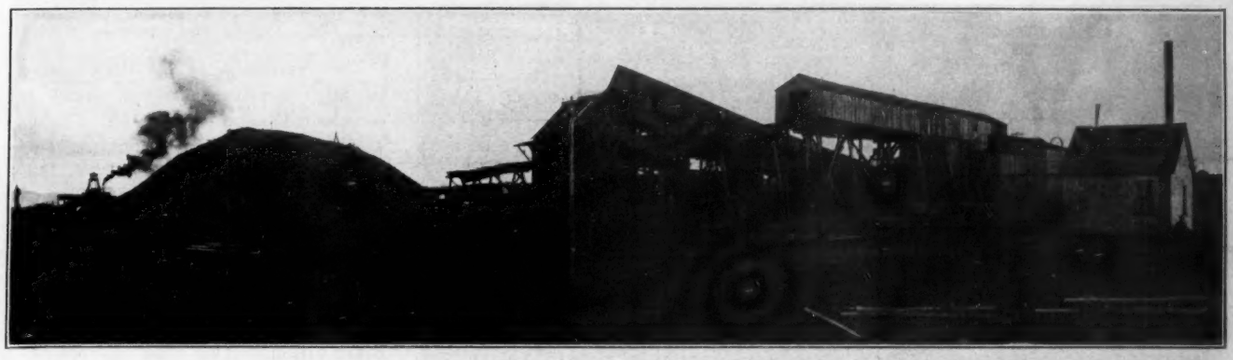


FIG. 3—No. 1 SLOPE ON SCOTIA BED. THE INCLINED BUILDINGS CONTAIN THE PICKING BELT.

the Dominion company, whereby the Scotia company acquired the right to drive two slopes, 50 feet apart, through its holdings in the Scotia seam. These slopes were commenced in May, 1906, and about the end of 1908 the Nova Scotia company entered its own submarine areas, after driving a distance of practically 4,000 feet. The interesting story of the manner in which these slopes were driven was told by R. I. and A. R. Chambers, the former being the company's superintendent of mines, in a recent paper before the Canadian Mining Institute. From this paper the following extracts were taken:

"An agreement was made by which slopes could be driven by the Scotia company through the submarine areas of the Dominion company. The point selected was the continuation of the No. 2 Slope, already being worked on the upper bed. At the shore line here there was cover of 68 feet, which was greater than at any other point east or west. The dip of the vein being 8 degrees to the north, or direction in which the work progressed, made it possible to commence the work with the plant then installed until the practicability of the enterprise should be determined. It was known that at distances of about 250 and 1,000 feet respectively serious faults would be encountered, and it was not considered advisable to make any expenditure for plant until these should have been passed.

"Work was commenced on May 21, 1906. In August the first fault was encountered. Fortunately, although this dislocation amounted to an upthrow of 29 feet, with only 85 feet of strata intervening between the workings and the bottom of the ocean, the quantity of water struck was trifling.

"From a study of the rock structure upon the land it was pretty evident that this upthrow would be followed by a corresponding downthrow after driving about 800 feet, running northeast and southwest, approximately at right angles to the fault first encountered. It was consequently decided to continue the slope in the strata underlying the ore in order to maintain as uniform a grade as possible. The wisdom of this course was verified by encountering the ore beyond the second fault at the distance and height expected, and of greater thickness. This fault was more serious, containing 4 feet of clayey decomposed rock, and an increased flow of water. The soft ground was handled by careful spiling and the water could easily be handled by two No. 6 Cameron pumps, the quantity not exceeding 80 gallons per minute.

"Beyond this second fault no serious difficulties were encountered for a further distance of 1,800 feet, at which point a downthrow fault of 26 feet was reached. The cover had increased to a total of 293 feet and in consequence a greater feeling of security was felt in providing against any difficulties which might occur. With the increased depth, however, a corresponding increase in firmness was found and the clay encountered in previous faults was not met here. The slope was continued in the strata overlying the ore, but with an increased grade for a distance of 400 feet, when ore was again entered having a normal thickness, and a normal dip of 12 per cent. The grade for the 400 feet was made 20 per cent, which by trimming will be subsequently reduced to 18 per cent. For this 400 feet the effects of the fault were noticed in the increased tenderness of the roof, necessitating timbers being placed skin to skin; and in the amount of water dripping from above. The total quantity of water was, however, in no way formidable. After re-entering the ore bed beyond this fault no difficulties have been encountered to the date of writing. The bed has the

FIG. 4—SLOPE ON SCOTIA BED, SHOWING ARRANGEMENT FOR LOADING MINERAL FROM STOCK.

FIG. 5—SCOTIA BED ON CLIFF AT EXTREME WEST END OF OUTCROP. THICKNESS INDICATED BY POINTERS IS 8 FEET.

normal dip of about 12 per cent, the ore has a section of 9 feet, and the quality is fully maintained. On entering the Scotia areas at a distance of nearly 4,000 feet from the shore, the conditions are as favorable as could have been hoped, and the more so in that the quantity of water handled is very small compared with what was expected."

In driving these slopes, the rate of advance varied from a minimum of 42.5 feet per month—when passing through the first fault—up to 270.1 feet. The size of excavation for this driving was from 13 to 15 feet in width by 8 feet in height. For a part of the time the hoisting was done by a 14 x 18 double cylinder Flory single friction drum hoisting engine, but as the work progressed this was supplemented by a 10 x 12 double cylinder drum Lidgerwood hoist, placed at the mouth of a shaft sunk near the shore for this purpose, and by an 8¼ x 10 double cylinder single friction drum, placed in a cross-cut from the advancing slopes and operated by compressed air. The pumping equipment included a duplex Jeansville pump, 18 x 8 x 24, operated by either steam or compressed air, this being located near the top of the submarine slope; two Knowles sinking pumps, 12 x 6 x 13 and 10 x 5 x 13, were employed for a time after passing the second fault but were later replaced by a 12 x 5 x 12 duplex Jeansville pump of anthracite pattern. Cameron pumps were used to keep the working face free from water. For protecting No. 2 mine from possible inundation sites for mine dams were constructed of concrete at a point where the face was narrowed to 6 feet at a point vertically below high water mark. Air and water pipes were built into the floor and timbers cut to fit the openings were placed conveniently near.

The ventilation of the slopes presented an interesting problem, which was commented upon by Messrs. Chambers as follows: "The ventilating plant consists of a 4-foot and two 3-foot Sturtevant fans. The 4-foot fan is direct connected to a vertical air driven fan engine, and is located near the upper parts of the slopes, just at the bottom of the present workings of the No. 2 mine, of which the slopes are a continuation. This fan is placed in the air course and is operated exhausting. The two 3-foot fans are placed as described below. The intention was to sink the slope by double entry. In practice, however, it was found that the tendency was to place chief importance upon the slope furthest advanced, with the result that it finally exceeded the secondary or ventilating slope by a distance of 2,900 feet. To provide for ventilating this long single slope, recourse was had to spiral rivetted galvanized iron pipe, connected with two Sturtevant blowers, with suitable bypass connection, so that they could be used either as blowers or exhausters. One of these was placed at the upper end of the pipe and the

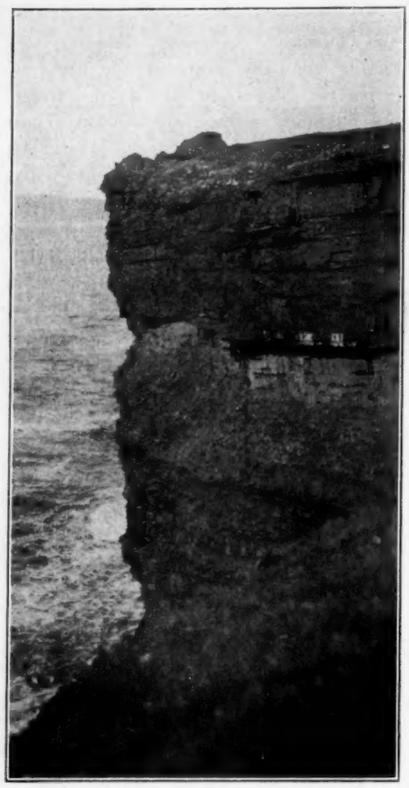


FIG. 6—NORTH SIDE OF ISLAND, SHOWING DOMINION BED DIPPING TOWARD SUBMARINE AREAS. THICKNESS OF MINERAL IS OVER 9 FEET.

FIG. 7—SCOTIA BED SURFACE WORKINGS, SHOWING CHARACTERISTIC CLEAVAGE OF THE MINERAL.

other reinforcing it about 1,000 feet further down. The first pipe used was 15 inches inside diameter and was found to be too small to give entirely satisfactory results. Below the lower fan 18-inch pipe was installed, which still continues to give a plentiful supply of air to the face of the slope. As the slope advances, new lengths of pipe are added. On account of the blasting, the pipe cannot be laid nearer than within 150 feet of the face, but no inconvenience whatever is felt in working at the face for this reason."

In the operation of the submarine areas, it is probable that the mine will be divided into sections of 600 feet, from each of which the mineral will be loaded over the slope into pockets by small motors. Plane haulage steel self-dumping cars of 20-tons capacity

FIG. 8—DOMINION BED SURFACE WORKINGS. MINERAL BETWEEN POINTERS IS 11 FEET IN THICKNESS.

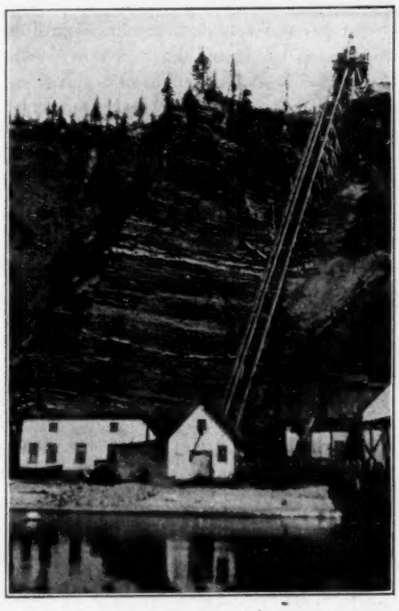


FIG. 10—HOIST NEAR LOADING PIER, SHOWING CHARACTER OF SHALES IN WHICH ORE BEDS OCCUR.

will be provided. For all work throughout the mine, excepting only drilling, electric power will be employed. The overlying strata has been found surprisingly good, the slope having been driven a considerable distance with less than 180 feet of overlay—the minimum stipulated by the Government for submarine operations, and it is probable that a part of the bed may be worked eventually to within 100 feet of cover.

The average iron content of the Scotia bed output is 53 per cent and in the Dominion bed about 50 per cent. Four sample analyses taken from the surface workings of the former show an average of 52.80, and three from the submarine workings average 50.64. Probably the most striking feature of these deposits is their regularity and uniformity over a wide area, and the facilities they offer for economical mining and shipping. In the underground Scotia workings the thickness of mineral is somewhat greater than at the surface; this has a length of about one and one-third miles on the outcrop and varies in thickness from six to eight feet. The lower or Dominion bed has an outcrop of some three miles with a thickness varying from five to twelve feet. The mineral breaks with a rhomboidal fracture and is easy to mine. The accompanying illustration, Fig. 14, taken from a recent official report on "The Iron Ore Deposits of Nova Scotia", shows this characteristic. This is also apparent in Figs. 7 and 8, showing the manner in which the ore is broken up into regular shapes by frost action.

The uniform nature of all these deposits is evidenced by a bore hole put down in the submarine area of the Nova Scotia company, which shows conclusively the continuation of all the beds with an even greater total thickness than at grass. This hole was sunk to a depth of 377 feet near the end of the submarine drive, starting at a depth of about 600 feet below high water level, and went through five bands of ore. Two of these are perhaps too thin to work now while the thicker seams are available, but the other three, in connection with the submarine slope, give a total thickness of ore of about 25 feet, all running above 51 per cent. A conservative estimate, made recently by a well known London engineer, places the amount of ore that may be mined from the land and near submarine areas—after making very liberal allowances for pillar

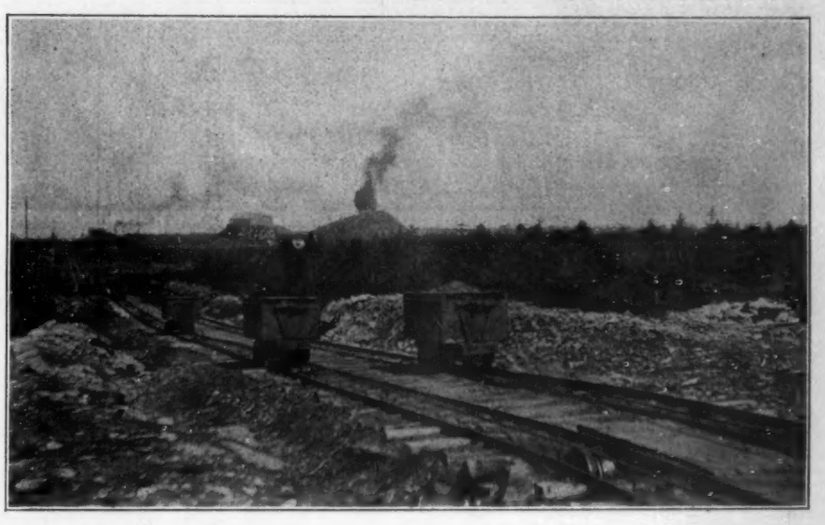


FIG. 9—ENDLESS ROPE HAULAGE TO SOUTH SIDE OF ISLAND, SHOWING ORE PILE OF DOMINION NO. 3 SLOPE IN DISTANCE.

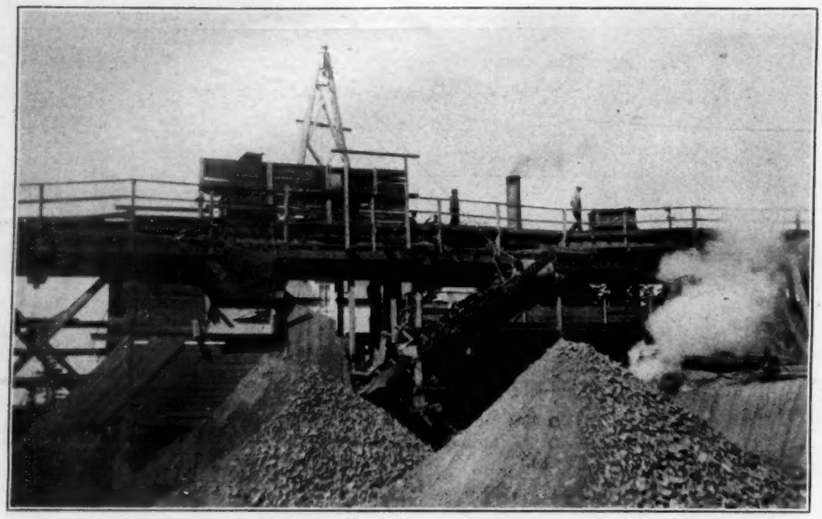


FIG. 11—BELT CONVEYOR DISCHARGING MINERAL INTO POCKET AT LOADING PIER.

and other losses—at 104,000,000 tons of "mineral practically proved" and 291,525,000 tons of "mineral reasonably supposed to exist". Of the former, the estimate of the land area "in sight and practically proved" is placed at 2,000,000 tons. The management of the Scotia company is fully satisfied that the inner submarine areas alone will yield over 500,000,000 tons of shipping ore, while the total ore underlying the inner and outer submarine areas of the company will exceed 2,500,000,000 tons. The geology of the island is extremely interesting. The ore deposits occur in shales and quartzite of Cambrian or Cambro-silurian age, which rest inconformably on the older Huron strata and appear to form a basin in the bed of Conception bay. The iron ore outcrops evidence the fact that glacial action has contributed to the erosion of the greater part of the strata, as the ore bed shows striation and thinning down, due to ice action. The outcrop is all on the north side of the island and the beds have a uniform dip to the magnetic north and a strike approximately east and west. One theory of their origin is that they were deposited in seas by weathering of land areas in which the iron was disseminated in igneous rocks, or that they have undergone some concentration from the mineral or other types of deposit. They are classed with the Clinton ores of the United States. The area of this ore basin and its shape cannot be exactly determined, though from such material as is available, the geological survey of Newfoundland concludes that it is elliptical in shape and about 5½ miles wide by 11 miles in length, but other estimates are larger.

From the report of Eugene Haanel on "The Iron Ore Deposits of Nova Scotia," the following comments on these deposits is taken: "The conditions under which the hematite occurs at Bell Island are especially favorable. The ore is interbedded with the strata. The beds now worked, two in number, lie at a low dip and are so situated that the large amounts were extracted by open-cut methods at an extremely low cost. Since underground mining has become necessary the expense is greater, but still low. Owing to the dip, a very large amount of ore can be extracted before sufficient depth is reached to give any substantial increase in cost of production from that source. The location is such that loading for water transportation can be accomplished very cheaply.

"What the history of iron mining in Nova Scotia would have been but for the discovery and purchase of the Bell Island deposits, none can say. Certainly it would have developed a smaller steel industry than is now possible, and as certainly it would have induced a higher cost for iron and steel and other products."

During the past 10 years iron ore imports to the United States from Newfoundland have shown considerable variation. As compiled by the bureau of statistics, department of commerce and labor, they are given below. The figures for the three years starred, 1899, 1900 and 1902, include a small amount from Labrador:

	Tons.
1899	77,970
1900	140,535
1901	79,360
1902	81,920
1903	86 730
1904	5,400
1905	5,600
1906	125 395
1907	89 685
1908	48,285

These figures, however, are probably too small, as for instance, in 1902 the Nova Scotia company shipped 86,341 tons to Philadelphia alone. During the past 10 years there has been shipped from the piers of this interest at Wabana over 3,750,000 tons of ore, distributed as follows:

	Tons.
To Germany	1,500,000
To Great Britain	500 000
To United States	1,000,000
To Canada	750,000
Total	3,750,000

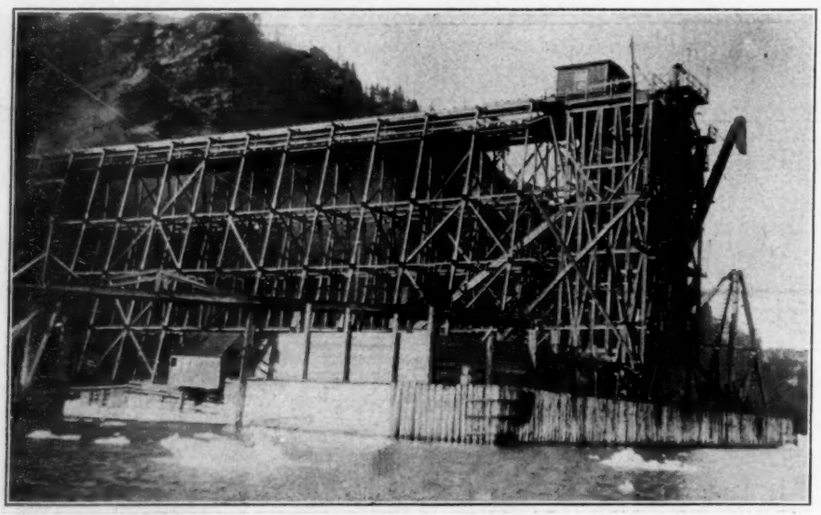


FIG. 12—ORE LOADING PIER. THE CONVEYOR RUNS ALONG THE TOP.

WILL BUILD SOON.

The Hohn Cement Brick Machine Co., Indianapolis, Ind., announces that it proposes at no very distant date to build a plant and install a complete line of machinery. The company is now manufacturing by contract a machine to make brick of standard size from sand and cement.

TENACITY AND MALLEABILITY.[1]

By William Misangyi, Budapest.

Most investigators consider that the deformations which a body undergoes under stress indicate a sliding of the particles of the solid body. While this sliding lasts, the friction between the particles has to be overcome, and these frictional forces form those internal resistances which the external force has to overcome when a permanent set results.

According to Mr. Rejto the internal friction is a function of the cohesion and of the coefficient of friction. When both these factors are constant, the internal friction will likewise be constant; when the cohesion or the coefficient of friction varies, the internal friction will likewise be changed.

Mr. Rejto designates as malleable materials those whose internal friction is constant, and as tenacious materials those, in which the internal friction increases while a permanent deformation is taking place.

The property of being shapable therefore consists in a tenacity and in a malleability. All shapable materials are either tenacious or malleable or tenacious and malleable. The case occurs pretty frequently that a material, whose internal friction increases, will still possess a further power of being shaped even after this internal friction has attained its maximum value; in this change of shape, however, the maximum internal friction attained will be constant. Such materials are in the first instance tenacious and become afterwards malleable.

The Hungarian Association for Testing Materials has in late years discussed the uniformity of the tenacious deformation and the behavior of the malleable materials. As regards the former problem Mr. Rejto asserted on the strength of his traction tests, that the permanent deformation was uniform during the period of tenacity. Mr. Bartel, on the other hand, observed in his tests that the test rod often turned conical during the period of tenacity. In order to elucidate this question I have conducted experiments for which I selected typical kinds of iron, soft, medium hard, and hard. My chief task was the accurate measurement of the cross-sections. My observations concerned nine cross-sections of rods, 100 mm in useful length and 8 mm in diameter. The original cross-section was not strictly cylindrical to start with; it displayed even in the very carefully selected test rods differences of from 0.19 to 0.25 per cent, and in the other test rods differences of 1 or 2 per cent in the cross-section. Thus with a cross section of 50 square mm discrepancies of from 0.5 to 1.0 square mm were observed in the maximum and minimum cross-sections. The tensile strength test was interrupted each time when an elongation of 5 per cent was noticed, and was only continued after an accurate determination of the cross-section.

These tensile tests demonstrate: (1) that the accuracy of the original shape has a great influence upon the development of the permanent deformation; (2) that the altered shape of the rod retains the character of the initial shape; (3) as a consequence of the want of homogeneity in the material, a smallest cross-section will only then be noticed at some spot when the original rod had very carefully been worked; otherwise the originally smallest cross-section will remain the smallest during the permanent deformation, but the difference between this cross-section and the maximum cross-section will go on increasing; (4) the altered shape of the test rod may appear conical after a tough deformation, provided the initial shape was already conical; at first this feature will not be noticeable on account of the small difference in the cross-sections; after a certain tenacious permanent deformation the difference

[1]Presented at Fifth Congress International Association for Testing Materials, Copenhagen, 1909.

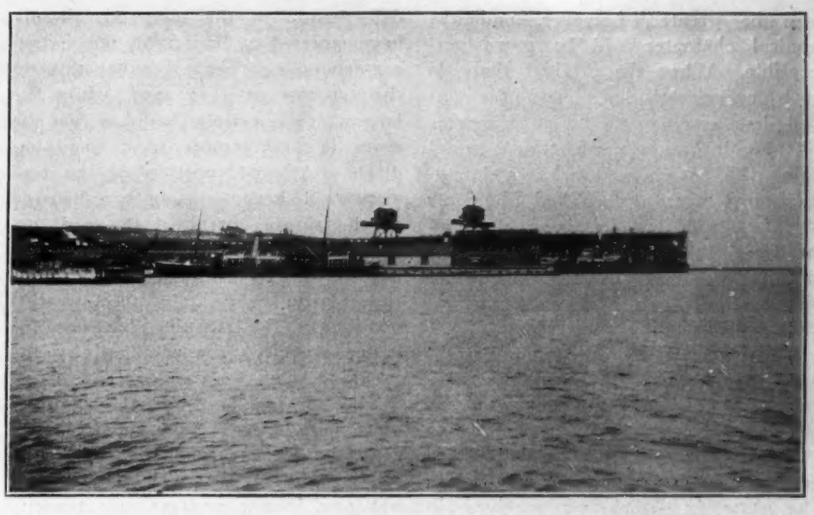


Fig. 13—Piers of Nova Scotia Co. for Handling Iron Ore, Coal and Limestone at North Sydney.

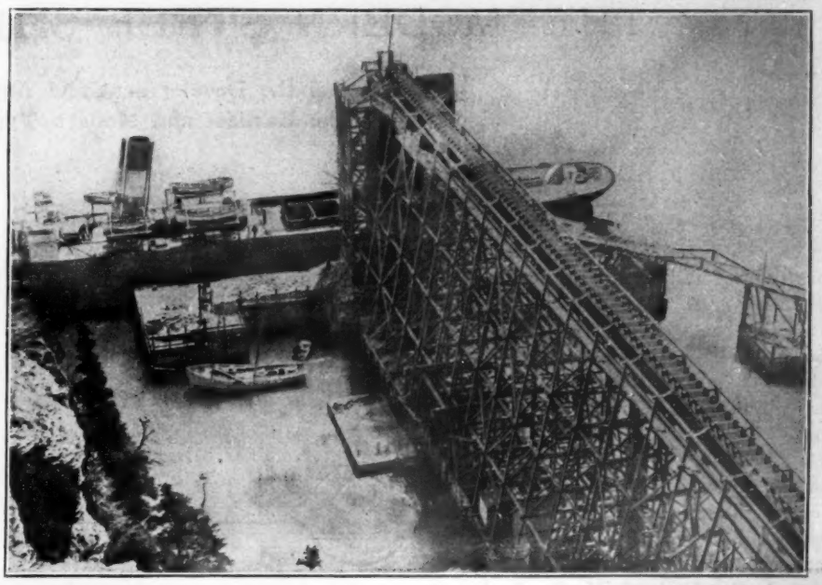


Fig. 14—Top View of Loading Pier Showing Conveyor.

will be greater, however, and the conical character will be more perceptible. When the original shape is truly cylindrical, i. e. when the test rod has exactly the same diameter all over its gage length, the deformation will be uniform with a homogeneous material. When however the test rod has not been carefully prepared, so that the cross-sections differ considerably, every cross-section will naturally undergo a diminution corresponding to its load.

The elucidation of the second problem, the behavior of malleable materials, necessitated the following experiments.

Thirty by 60 mm rolled iron, from Salgo-Tarjan, was first tested in the state in which we received it. We then prepared specimens of a cross-section of 30 x 30 mm. These specimens were broken in a Werder machine, solely for the purpose of producing a material which did not differ from the original in any other way, but that it had been put under tensile stress. Of the rods which had been submitted to this stress we prepared four pieces which were slowly stretched by cold hammering to such an extent that their cross-section was reduced one-eighth.

The comparative experiments made with the broken and the original material proved that the simple traction sufficed to destroy the greatest portion of the tenacity. Since, as was already mentioned, it happens frequently that the cross-sections differ by relatively large amounts from the start, the smallest cross-section will at the completion of the tenacious deformation of the test rod, already have suffered a diminution which will correspond to the real exhaustion of the tenacity at that spot, while the larger cross-sections will as yet be more or less remote from this condition. A small portion of the tenacity will hence remain unexhausted in the thicker parts of the rod, because the stress cannot any further be increased. This is, in our case, the reason why only the greatest portion of the tenacity, but not the entire tenacity, was nihilated by the breaking test.

The tension tests of the material stretched in the cold indicated already by the appearance of the stress-strain diagram that the material did not any longer possess any tenacity in that state. The stresses increased along a steeply ascending straight line. The maximum was quickly reached, and the contraction followed at once, so that a diminution of the cross-section was noticeable only near the spot of the contraction. In this way there resulted the value 0, for the uniform elongation and for the tenacity, but for the maximum strength and the maximum hardness the average value 74.70 kg'mm² while the original strength had been 33.55 kg'mm² and the maximum hardness 40.63 kg'mm².

The compression tests of the cold-stretched material indicated likewise, that the material had entirely lost its tenacity and had merely remained malleable. That is to say, the material still possessed a kind of plasticity which was only possible, however, with a constant internal friction. The compression stresses have been calculated for the altered unit cross-section and they were found to be constant until the height of the compressed specimen had become too small by comparison with the diameter.

We thus recognize that the tenacity is diminished and even altogether destroyed by stress applied in the cold, but not the malleability.

A further difference should be noted between the original material and the material after having been stretched in the cold; the cohesion rose from 118.7 kg'mm² to 169 kg'mm². Microscopic examination confirmed the assumption that the increase in the cohesion was to be ascribed to the finer grain structure; the original material showed large crystals and a coarse grain, while the stretched material displayed a very fine grain.

The originally tenacious and malleable material has hence altogether lost its tenacity by being forged in the cold, while retaining its malleability. Hence the material thus produced, still possessed a kind of plasticity corresponding to a constant internal friction. This is the malleable deformation. The substance affords a beautiful example of a merely malleable material which also possesses a very high strength. The original strength was raised to more than double its value, from 33.55 kg'mm² to 74.70 kg'mm², by the cold forging process; yet the material had not turned brittle; it still remained shapable, because the malleability could not be destroyed, nor diminished.

THE MODERN STEEL SHEET PILE

A History of the Development and Application of the Earliest and Modern Types.

By J. F. Springer.

(Continued from last issue.)

The United States steel sheet piling, as now rolled, differs somewhat from the form in Behrend's patent, but not essentially. This will be seen by comparing Fig. 22 showing the cross-section of the piling as rolled, with Fig. 18, showing the original design. An interesting example of the use of this sheeting is found in the sea wall at Fort St. Philip, La. This military post is situated on the eastern bank of the Mississippi river, and about 50 miles from its mouth, although the Gulf of Mexico is but a mile distant at the rear. There is an earthen levee on front and rear. The levee along the river seems to afford all necessary protection on the front, but the gulf levee was thought inadequate by the government, and to complete the defense against the waters of the gulf, the height of the old levee was increased 8 feet and an extension added. To prevent seepage through this embankment, a line of steel sheet-piling was constructed to form a curtain wall parallel with its axis and projecting 4 feet above its summit. The piles were 19 feet in length. From a point near the top of the levee, they were protected by a rather thick facing of concrete, front and back. This concrete wall extended a foot above the tops of the piles. That this precaution of a sea-wall is necessary may be understood from the fact that on Sept. 27, 1908, there was established a high water record at a point a few inches above the summit of the levee

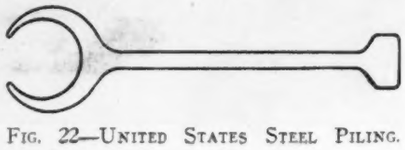


Fig. 22—United States Steel Piling.

FIG. 23—UNITED STATES PILING; SEA WALL AT FORT ST. PHILIP.

as it had been reconstructed. In other words, if the gulf water rises as high again they will beat against the concrete face, when the piling may have to withstand their force. In all, a line of piling 4,400 feet in length was constructed. The specifications required that the web should not be less than 3/8 inch; the width of the sections was about 12 inches, and this sheeting weighed about 35 pounds per square foot. It was heavily coated with asphaltum pitch, which the specifications required should have been thoroughly dried before driving began. When in place, sealing against water was accomplished by filling the space in the joint with a cement mortar—three parts sand and one part cement. The concrete enveloping wall was reinforced with plain round steel bars in addition to the core of piling.

Upon referring to Fig. 23, the upper portion of the Fort St. Philip sea-wall may be seen as it was before the envelope of concrete was applied, and in Fig. 22 may be observed the general appearance of the wall subsequent to the concreting. We may, of course, look at the completed wall as a concrete construction with the piling acting as the main steel reinforcement. The foot of the wall was considerably spread, but this cannot be seen in Fig. 24, although the foot is just below the surface.

In the employment of any kind of steel sheeting for temporary work, the question must be considered as to the condition of the piling when it is removed. If it is nothing more than scrap steel, its salvage value will be small, and the net expense for the use of the sheeting will be large; indeed, if the piles had to be thrown upon the scrap heap after having been used, the application of steel piling would be rather limited, but with a first-rate type of pile, this is not at all necessary. Ordinarily, the piling is approximately as good after use as it was before, and so can be used again. Frequently, such piling as the United States, which presents a very compact cross section to the material through which it is driven, may be driven with wooden mauls; this is especially the case in temporary work where the necessary penetration is small and the soil loose. Thus, to cite an example, the narrow 6-inch light weight United States steel sheet piling used in the construction of the Jamestown boulevard, Norfolk, Va., is said to have been used 35 times. There were, in all, about 7,000 feet of trench. The material which it was desired to shut out was quicksand. A 200-pound gas hammer was used for the driving, and withdrawal was accomplished by means of a tripod and horse. We may take for another example a case which occurred near Buffalo, where the Wickwire Steel Co. desired to put in a 30-inch intake pipe for their plant on the Niagara river. The trench necessary for this work was 700 feet long, 5 feet wide and 12 feet deep; the material to be excavated was sand, gravel and quicksand. The contractors did not buy sheeting for the entire 700 feet of trench, but for a section one-tenth this length. It is said that some of the United States piles used were driven 13 times. Sixteen-foot lengths of this 12-inch, 35-pound style were employed

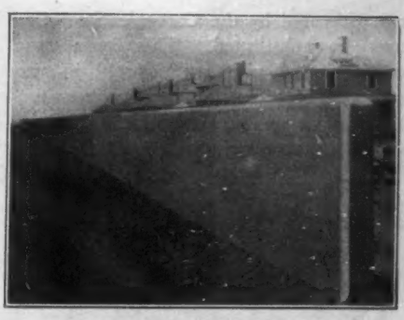


FIG. 24—COMPLETED SEA WALL AT FORT ST. PHILIP.

and these were driven with a 2,800-pound drop-hammer, while a water-jet was used in difficult places. As to the expense, the sheeting itself cost $1,795, and the driving and pulling about $1,500, making a total of about $3,295. The contractors thought the salvage value was $1,400, consequently, the net cost was about $1,895. It has been estimated that the use of wooden sheeting would have entailed an expense of $4,200. If there is no credit to be subtracted from the $4,200, then the expense in using the steel sheeting was less than half what it would have been with wood. In Fig 25 we have a view of a portion of this trench lined with the steel piling. By examining the foreground, the method of turning corners will be observed.

The United States steel sheet piling is an exceedingly useful form and has a very wide application both in respect to temporary and permanent construction. However, if stiffness and resistance to horizontal thrust are required in very large amount, the Friestedt sheet-pile, also

FIG. 25—UNITED STATES PILING; TRENCH FOR INTAKE PIPE, BUFFALO.

manufactured by the Carnegie Steel Co., may be substituted. This is a type of fabricated pile, and is sold in two styles. These may be seen in cross-sectional view in Figs. 26 and 27, where it will be observed that the channel and

Fig 26

Fig. 27

FRIESTEDT STEEL PILING.

the Z-bar are the basic forms. In the lighter style (Fig. 26), every alternate pile is an unaltered channel bar. The intervening piles each consist of a channel and two Z-bars; the latter are riveted to the inside of the web of the channel to form interlocking spaces for the flanges of the plain channels. It will be observed that the form of the interlock is such as to make it effective in every direction except the vertical. When it is desired to turn a corner—whether it be a right angle or not—one of the fabricated piles may be cut in two longitudinally and then reunited by means of a suitable angle-bar. This form of steel piling makes a very rigid and strong type. Thus, consider the channel itself: There can be no question that the distribution of metal into this form gives more rigidity and lateral resistance than if the cross-section were a solid rectangle. Weight for weight, the channel is the more rigid.

An example of the use of the lighter style of Friestedt piling was in connection with the construction of the United States government bridge across the Mississippi river at Rock Island, Ill. Four cofferdams were required in order to lay clear the footing level for four piers. This footing level is about 22 feet below the surface of the river, which is about 10 feet deep at these points. The 12 feet of earth consisted of 7 feet of sand and gravel and 5 feet of hardpan. The contractors did not buy piling for four cofferdams, but for one only. The drop hammer used weighed 2,600 pounds and was allowed to fall about 12 feet. A view of one of these cofferdams is given in Fig. 28. By examining the figure closely, it will be noticed that some slight damage was done to the heads of some of the piles. This will not seem surprising when it is stated that the putting down of the piling was accomplished without the use of a driving hood.

A heavier style of Friestedt sheeting is shown in cross section in Fig. 27. The trade name of this style is the Symmetrical Interlock Channel Bar Piling. In this, we have the form of Fig. 26 with the unaltered channels replaced by the built-up forms; in other words, the heavier type is formed entirely of piles, each of which is a channel with two Z-bars riveted to it. One of these extends the full length, the other is a short piece at the top. All the piles are alike. There can be no question but that this piling is stronger and stiffer as a whole, and that the interlock is not only more secure but that it forms a tighter joint against water. The actual weight is not much greater. Thus, if we compare two walls of sheeting, one formed of the one style of piling, the other of the other style, we find but little difference per average square foot. For example, the lighter piling formed of 15-inch 40-pound channels weighs 44 pounds per square foot, while the weight per square foot of the corresponding heavier style is 45 pounds.

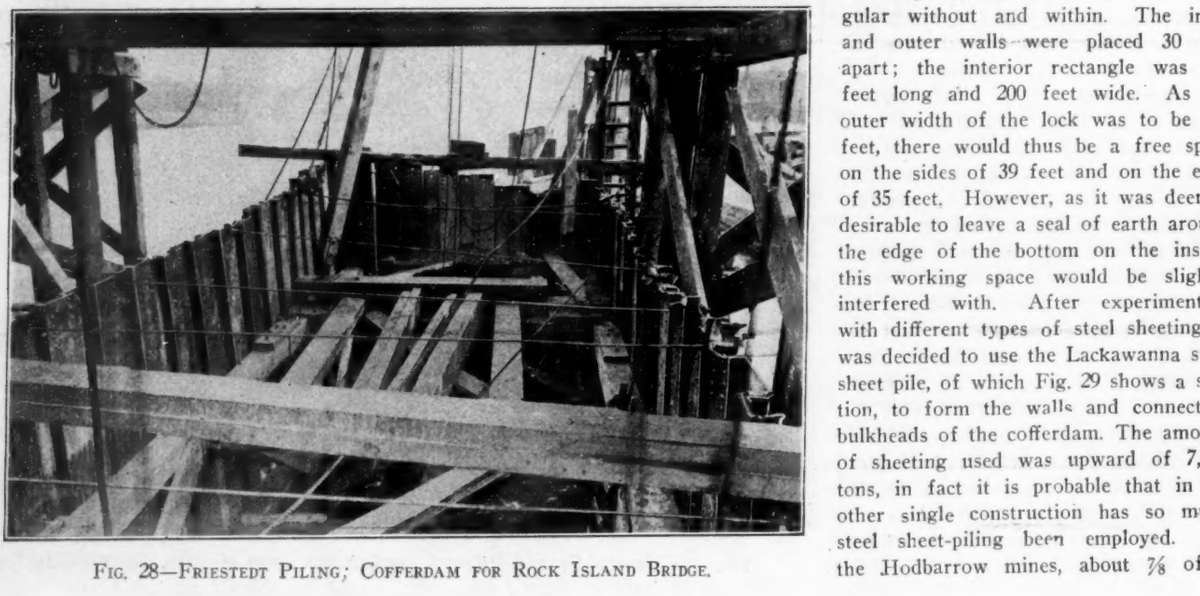


FIG. 28—FRIESTEDT PILING; COFFERDAM FOR ROCK ISLAND BRIDGE.

Black Rock Harbor, Buffalo.

One of the most notable cases of the employment of steel sheet-piling was in connection with the construction of a large ship lock at Black Rock harbor, Buffalo. Like the locks of the Panama canal, this one is to be of concrete, 817 feet long outside, and 70 feet wide inside. The depth of water at the site varies from 3 to 15 feet. Bed rock

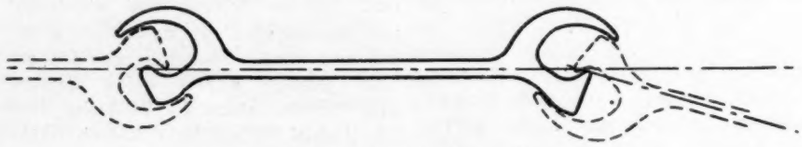


FIG. 29—THE LACKAWANNA STEEL PILE.

lies at an average depth of about 40 feet below the surface of the water and this is overlaid with a layer of gravel and clay, which in turn is covered with gravel and fine sand. In order to construct the concrete lock in the dry and upon the bed rock as foundation, an immense steel cofferdam was constructed of such size as to enclose the site and of such depth as to reach the rock. Except for a slight deviation at one point, this cofferdam was rectangular without and within. The inner and outer walls were placed 30 feet apart; the interior rectangle was 887 feet long and 200 feet wide. As the outer width of the lock was to be 122 feet, there would thus be a free space on the sides of 39 feet and on the ends of 35 feet. However, as it was deemed desirable to leave a seal of earth around the edge of the bottom on the inside, this working space would be slightly interfered with. After experimenting with different types of steel sheeting, it was decided to use the Lackawanna steel sheet pile, of which Fig. 29 shows a section, to form the walls and connecting bulkheads of the cofferdam. The amount of sheeting used was upward of 7,000 tons, in fact it is probable that in no other single construction has so much steel sheet-piling been employed. At the Hodbarrow mines, about ⅞ of a

linear mile of sheet-piles was driven; here, over 1¼ miles. The disparity is still further emphasized by the fact that the English piles averaged only about two-thirds the length of the American. However, we must remember that the use of the steel sheeting at Buffalo was not for prmanent work.

The transverse bulkheads were simply sheets of piling connecting the outer and inner walls of the cofferdam. They thus divided the intervening space into compartments which were, with few exceptions, 30 feet square. All of the piling was driven to rock and projected above the main water level about 5 or 6 feet. These compartments were filled with clay deposited on the natural bottom of the harbor. This cofferdam, when thus constructed and the water in the interior pumped out, constituted a water-tight enclosure within which the concrete lock was built in the dry. (See Fig 30).

A little consideration will convince one that the material within the compartments, particularly the upper portion, would by its weight, tend to bulge the wall of the cofferdam. In consequence, the sheet-piling might have to undergo severe tensile strains, especially in the interlock. The Lackawanna sheeting was tested to determine its capacity to withstand tensional strain. It is stated that the breaking strength of the interlock was thus found to be in excess of 9,000 pounds. The weight of the piling was 40 pounds per square foot of finished wall. The thickness of the web was ½ inch. The number of compartments was 77, and it was found that when filled the phenomenon of the bulging effect was indeed present.

No attempt was made to make the individual walls watertight, as by using wooden splines or clay within the interlock. This was scarcely necessary in view of the 30 feet of material. In driving, two weights of hammer were used, one a 5-ton and the other a 3-ton weight. The smaller hammer seems, on the whole, to have produced the better results, as while perhaps not so rapid in securing penetration, it did not damage the sheeting to the same extent.

It was at first thought necessary to drive the piles between walings bolted to the temporary wooden piles. This will remind the reader of the method adopted at the Hodbarrow mines. At Buffalo, however, this was found unnecessary, the edge of a moored float being found a sufficient guide. But we must remember that the driving at the Hodbarrow mines was, at times, very hard, while here there seems to have been little or no difficulty. On the other hand, to the superior efficiency of the interlock must be given a large part of the credit. It should be mentioned that the piling was strengthened by the use of waling pieces formed by channel bars.

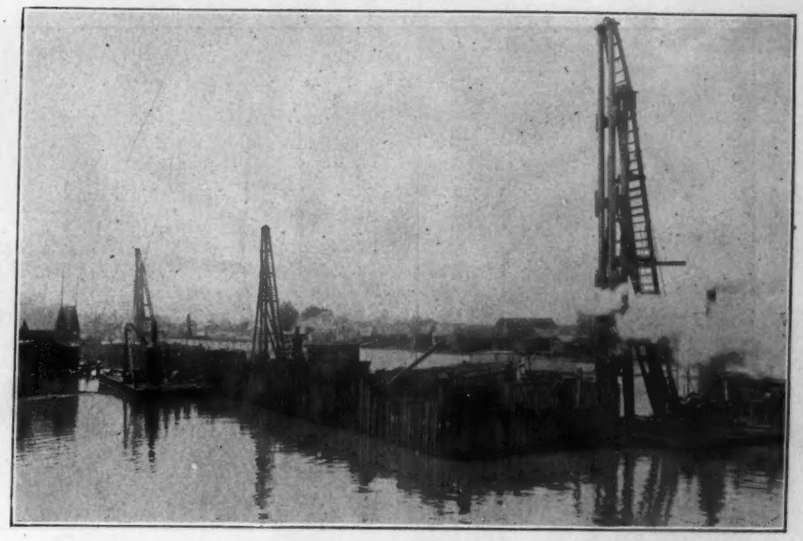


FIG. 30—LACKAWANNA PILING; COFFERDAM FOR LOCK BASIN, BLACK ROCK, N. Y...

It seems unquestionable but that this style of piling will prove a very valuable type; the experience at Buffalo, where the interlock was subjected to an actual bulging strain points to this, and further, the fact that each pile consists of a single piece of metal is a strong advantage. There are no rivets or bolts. The pile seems slightly unsymmetrical in one direction, which might cause an engineer to fear that a forward or backward tendency might exhibit itself during driving, but apparently, there has been no real difficulty at Buffalo in this respect, and a little further consideration of the section would seem to justify the assumption that while the want of symmetry of *form* is undeniable, yet the center of gravity lies in the web itself. As to any inequality in frictional resistance arising from the lack of symmetry, its effect on driving is probably very small. On the whole, then, the section seems unobjectionable from the point of view of driving. A more serious consideration concerns itself with the question of watertightness. For temporary work, a fairly effective sealing is probably accomplished automatically through the material forced into the interlock by the driving operation. In the case of permanent construction, on the other hand, where it might seem desirable to use cement grout in the interlock spaces, it would appear that difficulty might arise because of possible inability to get a tube down them, but with an iron suitably shaped and attached to the lower ends of the piles, they could probably be made self-clearing and this would, of course, facilitate grouting.

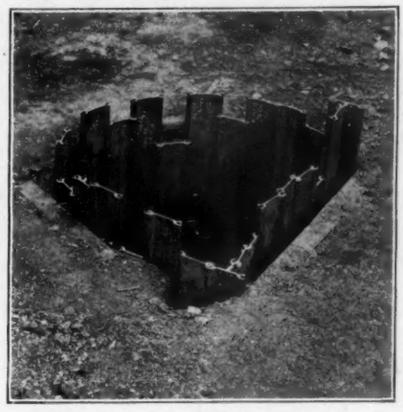
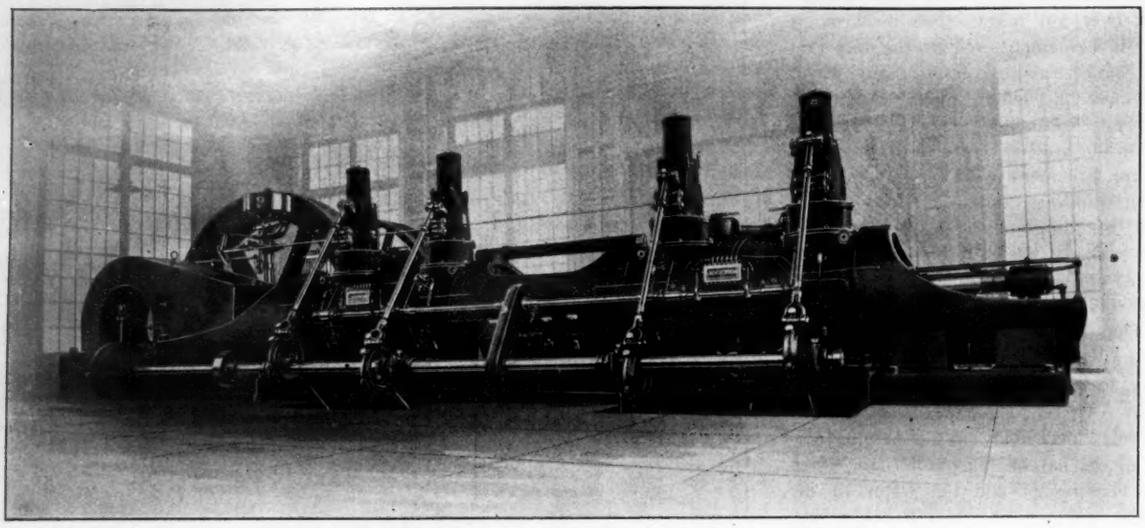


FIG. 31—LACKAWANNA PILING; SHOWING FLEXIBILITY OF CONSTRUCTION

The flexibility of the piling is shown in Fig. 29, where the possibility of an angular deviation of 22 degrees is disclosed. This is for the standard section which furnishes a 12¾-inch width of wall. In the smaller 7-inch section, this deviation is 16 degrees. What this flexibility is able to secure in the way of enclosing a small space may be seen from Fig. 31. A right-angle is turned by securing a split pile to a whole one by means of angle-bars, or two split piles may be joined by a single angle-bar. *(To be Continued.)*

PATENT AGREEMENT.

The General Electric and Westinghouse Electric companies are now at work on plans for the renewal of their patent agreement which runs out in 1911. It is stated that the new agreement will be along the same general lines as that now in force.



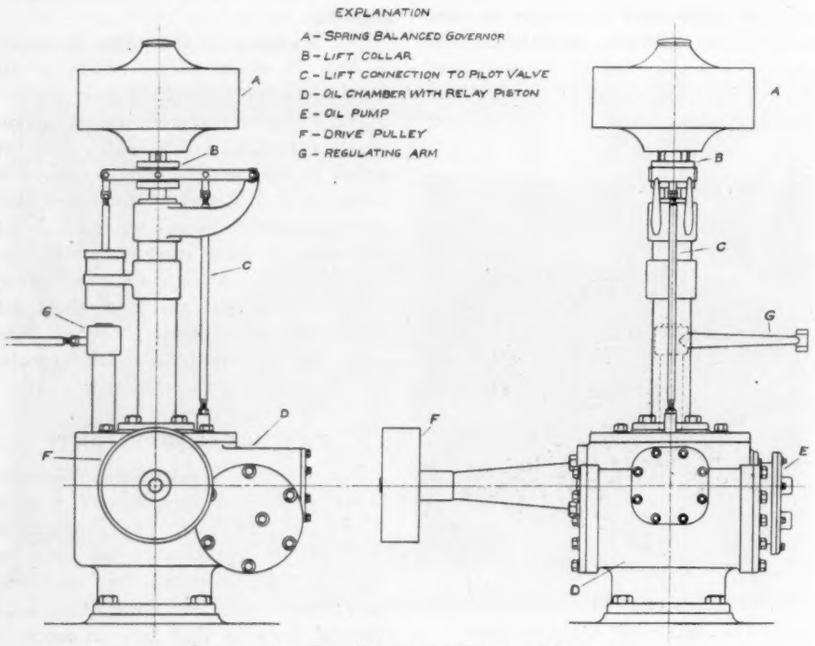
C. & G. Cooper Co's. Horizontal Tandem Gas Engine.

A NEW GAS ENGINE FOR LARGE POWERS.

Some years since the C. & G. Cooper Co., Mt. Vernon, O., became convinced that in certain fields of work a thoroughly practical gas engine would prove advantageous and a careful investigation of the gas engine situation in this country and in Europe was immediately begun. A few of the leading designs possessed special points of merit; none however, seemed to combine all the good features which appeared essential to a continuously successful engine. The company finally decided to design its own gas engine, and unite, if possible, all the most desirable engineering features which good modern practice had proven to be sound and valuable.

The company selected Martin A. Thiel, a German engineer of broad technical training, with many years of experience in designing and building several of the largest and most successful gas engines operating in this country, to supervise this important work. Mr. Thiel's wide experience in operating large gas engine plants has also proved valuable in solving many of the problems of gas engineering, such as ignition, timed lubrication, cooling and regulation.

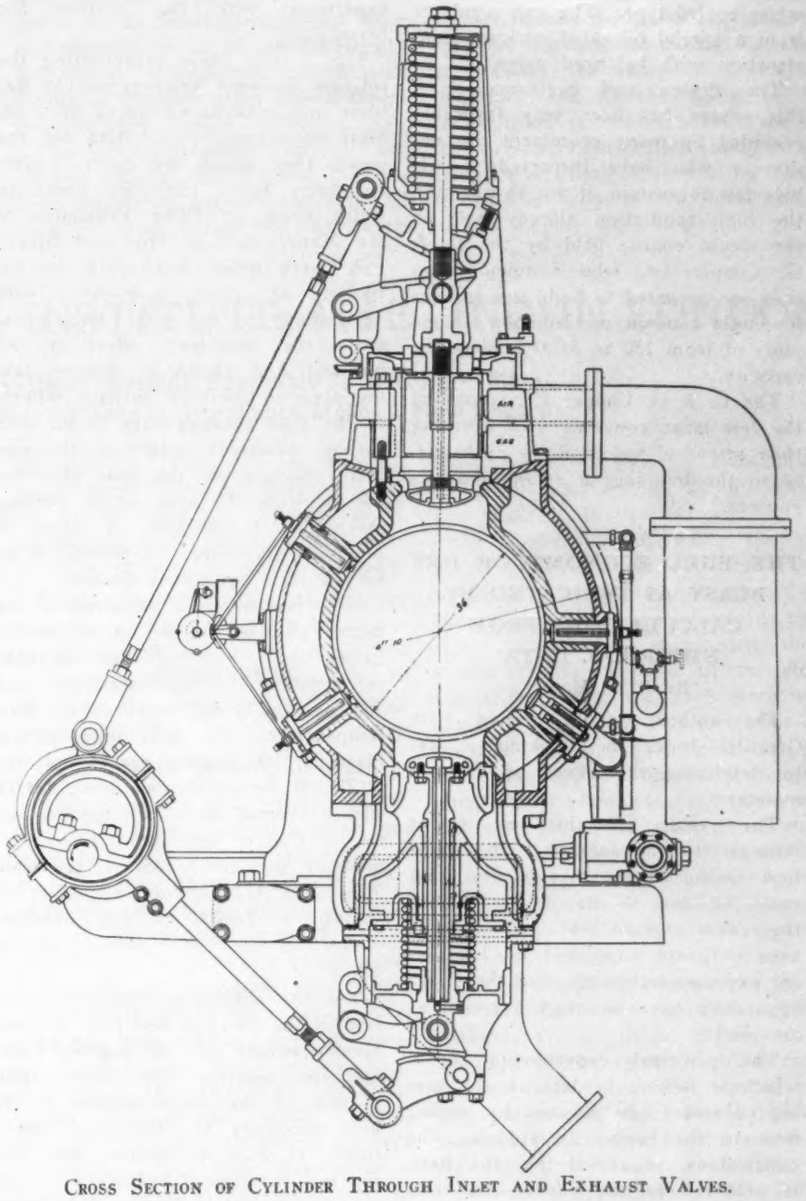
Little publicity has been given the extensive gas engine development work carried on by the Cooper company, pending endurance tests in service of the new machines. The Cooper gas engine is now claimed to be a demonstrated success, and an accepted standard in the gas engine field. Its regulation, running qualities and general reliability are said to have been proven to be equal to that of a steam engine of the highest grade; it is to be expected of course that the thermal efficiency is superior to that of any steam engine.



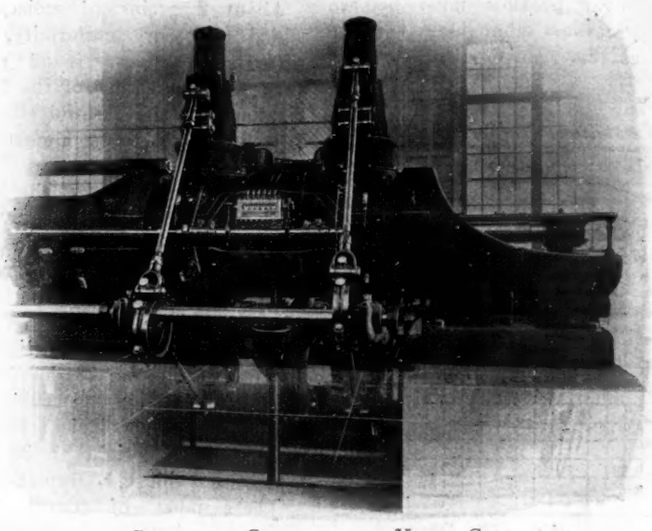
Automatic Oil Pressure Relay Governor.

The new Cooper engine is a double-acting, 4-stroke cycle machine, working on the constant mixture principle. Both the air and gas are distributed from the center of the engine so that they travel equal distances and with equal resistance to the intake valves of the respective cylinders. The mixture in all cylinders, therefore, must be identical in volume and composition under any given condition of load. Upon a similar principle the cooling water is introduced into the piston rods from a central point, and passes through each piston and piston rod, without reversing the flow, to the outlets at the forward and rear ends of the engine. The overhanging counter-balanced type of crank has been adopted. The bed is of heavy duty rolling mill type, with open top, permitting access to the crosshead, and easy removal of the cylinder head and piston through the bed. The bed is rigidly bolted to the foundation, while the distance pieces and tail rod supports, which are of cylindrical construction, rest on base plates in machined ways. The main bearing is of special design. The lower shell rests in a bored seat, and may be easily removed after relieving it of the weight of the shaft. This shell is babbitted and cored for water cooling. The side gibs are provided with wedge adjust-

ment on either side, and are lined with babbitt. The cap is babbitted at the ends only, and is used to clamp the quarter boxes and the bottom shell into place. In addition there is a transverse rib on either side of the cap extending the length of the bearing, which provides a retaining wall for the oil, and compels it to enter the bearing above the side gibs. The crosshead is fitted with an improved flat shoe, the top face of which is bored to allow the crosshead pin to align itself with the crank pin, should the latter be thrown out of the horizontal plane by shaft deflection. All pistons and piston rods are interchangeable, the pistons contain no ribs and float on hollow rods between the main, intermediate and supplementary crossheads. The rods are nickel steel forgings, drilled for water circulation and forced into the pistons. The cylinders are one-piece barrels, with inlet and exhaust chambers bolted to them, so as to remove all cooling strains in the castings. The water jacket is closed at its center by a belt in three segments. The cylinders are supported only at the ends by the main bed and guide castings, and as the piston and rods are carried by their respective crossheads, the cylinder barrels are permitted to expand and contract with freedom. The exhaust piping is of flexible construction throughout, insuring free movement for expansion and contraction due to changes of temperature. The ignition is of the "make and break" mechanically operated type, and two or more igniters are operated simultaneously at each end of each cylinder. This system is connected with a safety stop, which automatically breaks the electric circuit when the engine speed exceeds 10 per cent above normal, or the cooling water supply fails. The engine is regulated by varying the quantity of a constant mixture controlled by the governor through an automatic relay. The lay shaft is driven by spur and bevel gears, and is supported by bearings on the engine bed and base plates, thus avoiding temperature changes as when carried on the cylinders or change of imperfect alignment as when supported from the foundation. This construction has the additional advantage of permitting the removal of the cylinders without disturbing the lay shaft bearings. The inlet and exhaust valves at either end of each cylinder are actuated by a single eccentric on the lay shaft. The exhaust valve is of the separate cage



CROSS SECTION OF CYLINDER THROUGH INLET AND EXHAUST VALVES.



DETAIL OF CYLINDER AND VALVE GEAR.

water cooled type. The gas regulator is of a special oilsealed enclosed construction with balanced valve.

The design and performance of this engine has been very favorably regarded by many prominent gas engineers who have inspected it. It bids fair to sustain, if not to advance, the high reputation already held in the steam engine field by the C. & G. Cooper Co. who announce that they are prepared to build gas engines in single tandem and double tandem units of from 150 to 3,000 horsepower capacity.

The C. & G. Cooper Co. is one of the few large concerns now devoting their attention and facilities exclusively to the building of steam and gas engines.

THE FUEL ECONOMY OF DRY BLAST AS INDICATED BY CALCULATIONS FROM EMPIRICAL DATA[1].

By R. S. Moore[2].

The author was associated with Greville Jones in making a test to determine the effect of uniform moisture.

The results of the test points strongly to the fact that the great heat saving of the Gayley dry blast must be due to its dryness. The theoretical explanations on this basis have not been supported by any actual experimental proof, and they have apparently been as much rejected as accepted.

The principal experimental proof which is lacking is data on the saving of fuel to be secured by adding heat to the bosh. In studying the conclusions suggested by the test, it occurred to the author that this hiatus is supplied by the results of experience with the Neilson hot blast.

Fig. 1 is a curve representing the relation between temperature of hot blast and coke saved based on cold-blast requirements, the data for the points from which this curve is plotted being taken from Sir Lowthian Bell's book on "The Principles of the Manufacture of Iron and Steel."

A curve which represents the variations of coke consumption with heat added to the blast, also represents the combined effect of all physical and chemical changes taking place in the blast furnace, whether the heat changes have to do with carbon monoxide reduction, the carbon reduction, or the heat absorbed by the iron, the slag, or by heating stock. It is therefore a curve of practice rather than of theory, in so far as it is accurately plotted.

It is evident from the slope of the initial portion of the curve, that a saving of 1 hundredweight of coke is obtained for approximately each 100 degrees Fahr. increase of blast temperature. The heat added in the blast per 100 degrees per ton of iron is 276,000 British thermal units; 154,000 British thermal units are required per ton of iron to disintegrate 1 grain of moisture per cubic foot in the blast. This heat is therefore equivalent to 154,000 ÷ 276,000 = 0.56 hundredweight on the initial portion of the curve.

But the saving in the upper portion of the curve is less than one-half hundredweight per 100 degrees Fahr., and the question now arises, what portion of the curve applies to the heat necessary to disintegrate moisture? It is a well-known fact, that for the economical reduction of iron oxide in the blast furnace, as large a proportion as possible must be reduced by carbon monoxide.

Now, as this reduction occurs most readily at about 1,100 degrees and decreases rapidly at higher temperatures, and as the temperature of the stock entering the furnace soon approaches this point, it follows that a limit to the amount of heat which should escape in the gases rising from the bosh is soon reached. It was pointed out by Sir Lowthian Bell years ago, that the economy of the Neilson hot blast was due to the fact that adding heat to the blast enabled it to supply much of the heat necessary in the bosh to melt the iron and slag. The heat which was thus absorbed did not have to pass through the upper carbon monoxide reducing zone, thereby heating it and retarding the reduction.

Now, the heat which the iron and slag require is only about 18 per cent of the total; it appears self-evident, therefore, that the fewer heat units which are added to the blast, the easier it is for the iron and slag to absorb them before they pass out of the bosh; but as the 18 per cent is approached, more and more escape to the reduction zone. Therefore, removing the moisture before it enters the furnace is equivalent to utilizing all the heat necessary to disintegrate it in melting the iron and fusing the slag. The economy to be expected from low moisture alone is therefore that represented by the initial portions of the curve, or 1 hundredweight of coke for 100 degrees Fahr. temperature of blast, or, as pointed out before, 0.56 hundredweight per grain of moisture per cubic foot.

If 5 grains be taken as the average amount of moisture which can be eliminated, this would be equivalent to 5 × 0.56 = 2.8 hundredweight; 2.8 ÷ 20 = 14 per cent of 20 hundredweight per ton of iron.

About 2 grains of moisture were added to secure uniformity, and no gain or loss was found except a very slight lowering of the silica, indicating that the harmful effect of the 2 grains added was almost neutralized.

If it be assumed that the heat gain due to uniformity is equivalent to one-half of this, or to the effect of 1 grain, the foregoing considerations would account for a saving of about 17 per cent of fuel for dry blast. It may be said that a saving of 2.8 hundredweight on 28 hundredweight coke consumption on cold blast is not necessarily equivalent to a saving of 2.8 hundredweight on 20 hundredweight hot blast consumption.

There must, of course, be some difference, but it is probably very slight, because, while under cold-blast consumption 40 per cent more

[1]Presented at September meeting Iron and Steel Institute.
[2]London.

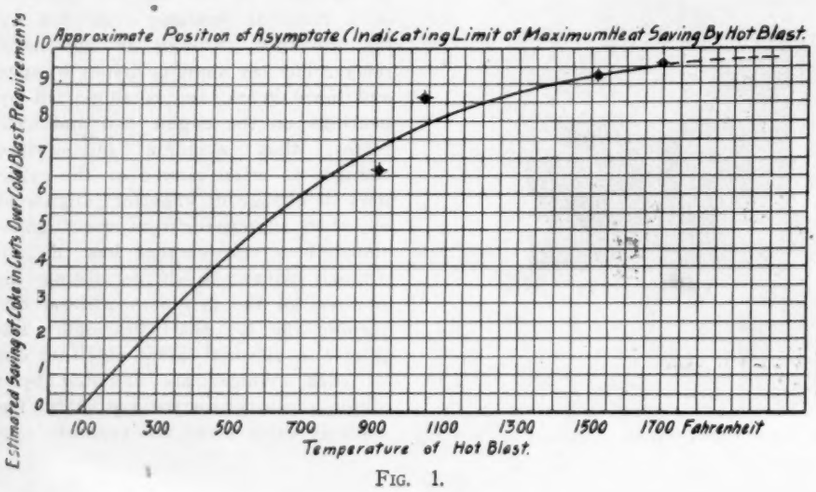


FIG. 1.

coke is burned than under hot blast, 50 per cent more ore is contained in the furnace under hot blast conditions. Therefore, while there is less carbon monoxide generated, it acts on 50 per cent more ore, and under better conditions of efficiency, namely lower temperature. The rate of increase of ore volume to coke volume is also approximately twice as great per hundredweight of coke decrease at 20 hundredweight hot blast consumption as at 28 hundredweight cold blast consumption. The coke saving in the two cases should therefore be very closely similar.

The author regrets that, in the limited time at his disposal, he has been unable to get reliable and full data for more points for the curve. The data is difficult to find, because all the figures for the curve must be for one furnace, operating in each case under the same conditions of ore, fuel, and fluxes. As it is, he trusts there is sufficient to allow of the present contribution finding acceptance as another interesting chapter of the story of the development of the Gayley dry-air blast.

IRON AND STEEL INSTITUTE MEETING IN LONDON

Gayley Dry-Blast System Favorably Discussed — Members Visit Many Plants — Attendance Makes a New Record

The autumn meeting of the Iron and Steel Institute was held in London, Sept. 28 to 30, the meetings taking place as usual in the council chamber of the Institution of Civil Engineers, in Westminster. The attendance constituted a record, about 1,300 members taking part in the meeting and the various visits arranged. The wretched weather conditions made the visits to various places of interest extremely unpleasant. Although Americans were not present to the extent they were in the spring, American practice constantly figured in the discussion, and great interest was taken in the lengthy cablegram from New York, from James Gayley, D. Sc., past president of the American Institution of Mining Engineers, which was read at the meeting on Wednesday morning.

At the opening of the proceedings, Lord Airdale, of Gledhow, presided in the unavoidable absence of Sir Hugh Bell, the president, who was detained in the north by an engagement. His lordship had on his right His Grace the Duke of Devonshire, president-elect, and there were also present E. P. Martin, past president, and the following vice presidents: Sir John G. M. Alleyne, Bart.: A. Cooper; P. C. Gilchrist, F. R. S.; A. T. Tannett-Walker and masters of the council as follows: G. Ainsworth; C. J. Bagley; J. C. Cunningham; W. Evans; A. Lamberton; J. E. Stead, F. R. S.; W. M. While; I. Williams, with J. C. Lloyd, secretary, and L. P. Sidney, assistant secretary. The members included Lord Glantawe of Swansea, Prof. Turner, Prof. Carpenter, Prof. McWilliam, Messrs. A. W. Richards, F. Lloyd, C. Johns, P. Longmuir, and other well known iron masters and experts.

The secretary reported that the following vice presidents and members of the council would retire and be eligible for re-election in May of next year: Messrs. Arthur Keen, Sir W. T. Lewis, P. C. Gilchrist, C. J. Bagley, J. H. Darby, W. Evans, J. E. Stead, and Sir Alfred Hickman.

This completed the preliminary business, and the secretary then proceeded in the absence of the author to read the paper on the refining of steel by electricity by E. J. Ljungberg of Sweden.

The Electric Refining of Steel.

The discussion was opened by P. R. Cobb, London, who pointed out that the writer was not quite correct in saying that there had been practically no advance in the commercial use of the furnace described. He himself had had previously an interview with Mr. Grönvall, one of the principal inventors of the furnace, who had just returned to this country from Canada, where he had been able to fix up some very large contracts at Sault Ste. Marie, one of the principal iron producing centers in Canada. The firm there took a favorable view of the prospects of the furnace, and were prepared to back their opinion by putting down money in installing three furnaces. It was expected that the furnaces would be running some time before the middle of next year, by which time something more definite might be said on the subject. The speaker, replying to the chairman, said he was unable at present to give any detail as to mineral consumption.

The chairman proposing a vote of thanks, which was heartily carried, said the subject was one of great importance, and it would be a great improvement if they would be able to produce iron by utilizing water power, and without the use of coal fuel.

Steam Versus Electricity.

The next paper was by C. A. Ablett, B. S. C., London, on "The Determination of the Power Consumption of Reversing Rolling-Mills," which was read by the author.

A. Lamberton, discussing the paper, feared that certain statements would give rise to misconception. Certain claims were put forward that steel makers had superseded their steam engines in favor of the electric mills, and it was said there was greater economy in fuel consumption, reduced running cost, cost of repairs, management expenses, lengthened life of plant, etc., but there was not a single figure given from start to finish to substantiate those claims. Details were given of the kilowatt hours in rolling certain sections. They would remember that a year ago Mr. Ablett read a paper at Middlesborough, in which he gave exactly the same particulars, but without giving those actual costs, which would be so useful. The term kilowatt was academical, but £ s d was commercial, and makers attached as much importance to the commercial aspect as to the academical, as they wanted actual costs. Mr. Grönvall had similarly refused definite information, although he assured them that eight mills were being put down. They were still without the information, and the best they could learn was that electrical reversing rolling was very nearly as cheap as steam. They had to consider the first cost of steam plant and of electrical plant, with interest and depreciation and fuel consumption. From records by insurance companies, such as are published annually by the Manchester Steam Users' Association, they learned that the amount of upkeep in motors was practically twice that of steam engines, and the amount of premiums charged was twice as much for dynamos. For depreciation, 15 per cent had been allowed, for electrical machinery, as against 10 per

cent for steam plants, but 15 per cent was too little. At the Middlesborough meeting, Mr. Grönvall said that a ton of steel could be rolled by steam power under 6d per ton, but in the electrical mill it would be greater than that under certain circumstancess, but here again there were no figures in the paper to go upon. His own conclusion from the details given by the author was that it worked out at about 8d against 6d for steam, but the latter calculation was based upon a fuel cost of 6s per ton of coal burnt in the boilers. It seemed that in the electrical installation they got their fuel for nothing, and if they allowed the same basis of calculation in favor of steam, calculating the cost of electricity, they would reduce the steam cost to less than 5d per ton. The calculations were based upon a mill producing 300 tons of steel in 10 hours. Mr. Ablett appeared to think that further reduction of cost in the capital was impossible. The experience of engineers was, that apart from the question of noise the ordinary clutch reversing mill was very successful, and it was possible to overcome the objection of noise. The speaker proceeded to illustrate by diagram how the ordinary clutch arrangement could be improved.

The chairman pointed out that while Mr. Lamberton spoke with great authority on costs of continuous rolling of large quantities, day and night, that hardly disposed of Mr. Ablett's paper, because tnere were many mills which only worked in the day time, in which it would be very advantageous to draw electricity from such general stores as were being established throughout the country, and which could be switched off when they were not required. In connection with steam arrangements there were the installation of the boilers and the continual firing, whether they were using the power or not. In cases where a high-finish was required, it was often desirable to work only in the day time.

Electric Power Economical.

A. Siemens, of London, remarked that the use of the kilowatt term in preference to money costs was obviously necessary because the cost of electricity differed in different localities, and they must remember also that electrical plants were sometimes driven by waste gases from the blast furnace, so that the fuel cost nothing. For over 20 years his firm had had a plant of 1,600 horsepower and when they added every charge, including depreciation and repairs, they got their power for a farthing a kilowatt hour. They had only to divide the figures given in the paper by four, and that gave the cost in pence. With regard to upkeep, a good many people would not realize that it was cheaper to employ a big motor than a little one, but he knew of a case years ago, where the installation at his suggestion of a big motor had effected enormous economies. That avoided the heating, which came from the small installation. If they had the motor too small repair costs were excessive, whereas in a big motor the current absolutely corresponded to the load. He had given a lecture 28 years ago pointing out that fact, which, it appeared, some people had taken all that time to learn. If they visited his works, as he hoped they would, they would see a generating plant which had been at work 20 years, and the cost of repairs had been practically nil. His advice to people who wanted a 10 horsepower motor was that they should put in one of 15 horsepower and they would not regret it. He certainly thought an allowance of 15 per cent depreciation was not justified, if the plant was properly selected, but they knew that insurance companies never missed an opportunity to charge a little more. The diagram that Mr. Lamberton had shown looked very well on paper, but there must be a lot of wear and tear from the considerable shock on the clutches.

New Electric Installation in Germany.

Mr. Ablett, replying, said he did not read the paper to prove the superior economy of the electrical system, but to enable users of mills to prove it for themselves. Shortly before the Middlesborough meeting, a plant was put down at the Rheinische-Stahl-Werke and those who put down the mills were able to promise 30 per cent more output. He had been there a few weeks ago, and was told that the plant had been running continuously since Sept. 4, and they had effected a saving of a shilling per ton in rolling on an output of 5,000 tons per week, and the oil consumption had been reduced by one-fifth. Since that time three other large German steel works had placed contracts for electrical reversing mills. The owners must have been very satisfied with the result, or they would not have incurred that expenditure. With regard to the question of depreciation, the Niagara Falls Power Co. had started generators of 3,000 horsepower about 14 years ago, and since that time they had found it necessary to re-wind the plant at the end of 10 years, but there was no reason why, having done that, they should not run for another 10 years. He would certainly consider that the figure of 15 per cent was far too high. He was familiar with another mill put down at the works of Georgs-Marien-Heint, Osnabruck, Germany, in which the mill had been running for a long time without a single stop, and the repairs had been practically nil.

On the proposition of the chairman, a hearty vote of thanks was accorded the author of the paper.

Distortion in Cast Iron.

The third paper taken was one jointly prepared by Prof. H. F. Rugan, New Orleans, and Doctor C. H. Carpenter, Manchester, on "The Permanent Change of Volume of Cast Irons After Repeated Reheating." This paper was read in abstract by Dr. Carpenter.

J. E. Stead, of Middlesborough, said the paper represented an enormous amount of very creditable work which had added much to their knowledge of the subject. It had been recognized for a long time that white iron did not grow so rapidly as gray iron, or become so distorted. For example, white cast iron fire bars would last a much longer time than gray bars, if they did not suddenly snap, as they are very liable to do. White iron also did not oxidize so rapidly as gray. It was very interesting to know that the oxidation of gray iron followed along the graphite plates. When iron had been heated and cooled, the graphite plates became more or less open, which admitted oxygen, and so, white iron containing no graphite would grow less rapidly; but he would like to know the amount of combined carbon present in their analysis, because he imagined they would find that the more combined carbon present, the less rapid would be the oxidation or growth. The result then would be still more valuable. The authors were to be complimented on their very excellent research.

Examples of Expansion.

Prof. Turner, of Birmingham, mentioned a case which came under his own notice some years ago in connection with a muffle furnace in which certain slits appeared which destroyed the grate of the furnace. There were many similar cases of expansion.

Whenever there was an opportunity for the crystal to separate there would be expansion. The fact that pure silica could be separated from silicon had a good deal to do with the fact of expansion. His own impression was that the expansion was similar to what took place in the case of lead, which they would find so stretched on a roof through the action of the sun that sometimes it would fall off the roof to the ground; and he could imagine iron being so heated that it would not shrink back to its original size.

E. H. Saniter, of Rotherham, and W. Rosenhein, of London, continued the discussion. The latter said that certain experiments that he had made by heating specimens of iron in a vacuum generally confirmed the conclusions arrived at in the paper.

A hearty vote of thanks was accorded the authors, the chairman remarking that Dr. Carpenter would reply to the discussion in writing.

Members Visit Plants.

This concluded the session, and the afternoon was spent in visits to the establishments of Siemens & Co., Ltd., Woolwich, the Royal Arsenal, Woolwich, the works of Fraser & Chalmers, Ltd., the London County Council's Electric Generating Station, Greenwich, the Hall of the Worshipful Company of Armourers & Brasiers, and the Hall of the Worshipful Company of Ironmongers. In the evening various theatrical performances were witnessed.

Second Day's Proceedings.

There was again a large attendance at the second meeting on Wednesday, presided over by the president, Sir Hugh Bell, Bart., the Duke of Devonshire, the president-elect, also attending. The discussions were preceded by the presentation of the Carnegie gold medal to A. M. Portevin, in recognition of particularly valuable research work. The president explained that the recipient was educated at the School of Arts and Manufacturers at Paris, and had made a special study of the properties and characteristics of steel alloys. He had submitted to the Institute results of further investigation, in regard to the properties of numerous special alloys, with the object of ascertaining the influence of the various elements added to steel. The meeting greeted the recipient with acclamation, and the gift was suitably acknowledged.

Discussion of Papers on Dry-Blast.

A paper was then read by R. Greville Jones, of Middlesborough, on "Uniform Moisture in Blast." The secretary read a paper on a kindred topic prepared by R. S. Moore, of London, on "The Fuel Economy of Dry-Blast as Indicated by Calculations from Empirical Data." The president explained that Mr. Moore's voice had broken down, but subsequently explained that it was his motor and not his voice had broken down, a correction which stimulated a little chuckle throughout the assembly.

J. E. Stead, opening the discussion, promised to give his views more at length by correspondence, but said he would like to know the actual amount of steam that went into the furnace for the whole period. They would naturally expect the increase of coke.

Cosmo Johns, of Sheffield, expressed the fear that it would be impossible to reproduce in implements the many complex circumstances, which entered into actual practice; but there was no doubt as shown by experience that there was a very important saving by the use of the Gayley system.

Mr. Saniter thought Mr. John's paper had added considerable information in elucidating the reasons of economy; but he agreed that there was no economy to be effected merely by levelling the peaks in the diagram. When they put more moisture through the blast furnace, they did not use more coke and they were doing more work. The economy had been contributed partly by the absence of moisture, and partly by the uniformity of blast.

Further Experiments Necessary.

J. H. Harrison, of Middlesborough, thought that four grains of moisture was quite a good deal to have taken out at that time of year, but it should be possible to keep down the moisture to two or two and a half grains, and that would be a further step towards elucidating the interesting problem as to where the saving came in. Where complete elimination was so expensive, it might be better to get it down to two grains rather than go the whole length; and further experiments might prove very valuable.

A. K. Reese, of Glamorgan, pointed out that the increase of moisture was no good to the blast furnace. A clear case had been made out as to the benefit derived from uniformity of moisture. Experiments had been tried at furnaces at South Chicago, which agreed generally with those at Cardiff, but at South Chicago the moisture actually removed was six grains to the cubic foot. The only possible explanation of the similarity and benefit derived must have been the uniformity of moisture, because they had twice as much moisture taken out at one place as another. The experiments were interesting and novel. Mr. Moore had shown great courage in taking up the question, while most iron masters were lacking in courage. He was more courageous in putting moisture into the blast than iron masters were in taking it out. He wished they would screw up a little more courage.

W. J. Foster, of Birmingham, called attention to a paper he had given some years ago showing the effect of eliminating moisture from the blast.

Gayley Sends Cable.

L. Sterne, of London, read the following cable which he had received from James Gayley, of New York:

Greville Jones' experiment shows he put more moisture into his blast with steam than was normal in the air at the time. Therefore, it is to be expected that the coke consumption on that furnace should be higher than previously with normal air. Jones took February in which to experiment, and charts show normal air moisture was very uniform, therefore did not increase the uniformity of moisture in marked degree. Had he taken a summer month, when the moisture would have been higher and more irregular, he might have gotten more valuable data. His experiments indicate that uniformly high moisture is no better than irregular moisture. A slightly lower uniform moisture and supply to engines, of air uniform in temperature, gives the greatest economy through the concentration of heat in the hearth and the uniform descent of uniform material into the hearth. Moore's paper shows that the extraction of moisture is equivalent to the heat value in the furnace, and shows a saving of practically 14 per cent in coke consumption. According to his calculations, the elimination of five grains of moisture is based on temperature equivalents, with the use of blast up to 900 degrees Fahr. He further shows that probably the saving in coke consumption being lessened as the temperature of the hot blast is increased, so also the saving in coke consumption will be lessened in a certain proportion by the use of dry blast due to better operation of the furnace, which latter again is due to greater heat concentration in the bottom of the furnace from more perfect general operation.

Practice in South Wales.

Mr. Sterne, continuing, called attention to certain figures exhibited with regard to South Wales practice, which he said could be relied upon. The figures he now produced could be vouched for, and they showed the benefits to be derived commercially by the use of dry air blast. Every iron master could figure for himself; but

in his district they had increased the output of the furnace by dry blast 15 per cent. In addition there were collateral advantages incidental to the system, and to decrease the cost with higher output was a matter of great importance. They could see that it would recoup entirely the outlay within 18 or 24 months, and it was surprising that iron masters should hesitate to install plants which promised such a profitable investment. In the United States, the Gayley system of dry air blast had already been adopted for furnaces requiring above 1,000,000 cubic feet of air per minute, and that result was mostly due to the investigation of the United States Steel Corporation. Mr. Gayley had devoted many years and had laid out considerable capital in the perfection of the system, and to him and to no other belonged the credit of the invention, which had made the greatest advance in the iron industry since the introduction of hot blast.

Corporation Uses Gayley System.

After some remarks by Mr. Hill, of Derby, pointing out that the United States Steel Corporation six or seven years ago introduced the Gayley system, and had extended its operation clearly because it had felt the benefit of it. Mr. Reece then showed that the United States Steel Corporation had three furnaces in operation at South Chicago, and is now introducing the dry air system at three others; but he believed plans had been prepared for 20 furnaces.

At this stage, the discussion was interrupted by the scrutineers who reported the election of a number of new members nominated which, we understand, was about 50.

G. Jones, in the course of a brief reply, expressed the belief that dry air practice was going forward in Canada more rapidly than in the United States, and he believed that more of such furnaces were actually in operation there.

Experiments Costly.

The chairman expressed the belief that the solution of the problem relating to dry air blast was of pressing urgency. He could not help feeling from the discussion that a definite solution had been further postponed. He had been reminded of a saying of Mr. Weldon that it cost £10,000 and took ten years to make an experiment, but those who had been accustomed to make experiments in the iron trade felt that Mr. Weldon had underestimated the cost and the time. His own firm would have been very glad indeed if everyone of their experiments had cost no more than £10,000. Bell Bros. were very glad to place their furnace at the disposal of Mr. Jones, but it was clear that more experiments were necessary.

The remaining paper dealt with was by J. R. Carulla, Derby, on "Artificial Magnetic Oxide of Iron," which was read by the author. In view of the similarity of subjects, extracts were read from the paper on "Corrosion of Iron," by J. Newton Friend, of Darlington. A brief discussion followed.

The chairman said the question of corrosion was one of considerable urgency now that iron and steel were entering so largely into constructive work, and anything that rendered those materials less liable to attack when exposed to atmospheric influence must be of very great value. They were greatly obliged to the readers of the paper for the information conveyed.

Members Entertained.

This concluded this sitting, and the afternoon was spent in visits to the National Physical Laboratory, Teddington, the Motor Car Works, D. Napier & Son, Ltd., Acton, the Mitchell Motor Works and Garage, Soho, Lambeth Palace, and the Royal Doulton Potteries, the Royal Small Arms Factory, the Mint, and the Power Plant Co., Ltd., West Dayton.

In the evening, members and ladies were entertained informally at a dinner given by the reception committee at the Trocedero Restaurant, and a number also attended theatrical performances.

(To be Continued in Next Week's Issue.)

PENNSY RAIL ALLOTMENT.

Philadelphia, Oct. 8.—Official announcement by the Pennsylvania Railroad shows that the distribution of its recent rail order for 200,360 tons, 1910 delivery, was practically as reported in THE IRON TRADE REVIEW of Sept. 30, being as follows: United States Steel Corporation, 83,300 tons, of which 56,200 tons will be furnished by the Illinois Steel Co., and 27,100 tons by the Carnegie Steel Co.; Cambria Steel Co., 41,800 tons; Pennsylvania Steel Co., 41,800 tons; Lackawanna Steel Co., 19,550 tons; Bethlehem Steel Co., 13,910 tons.

The Balster Brazing & Machine Co., Baltimore, Md., has leased quarters in that city and proposes to manufacture small parts for automobiles.

TOO MUCH BEER

Interferes with Operations in the Connellsville Coke Regions.

Unsatisfactory labor conditions in some cases and lack of water are still troubling coke operators in the western Pennsylvania district. The scarcity of labor appears to be felt most in the mines.

The Coke Producers' Association in its review of conditions for the week ending Oct. 6, says as follows:

Reports received of coke oven operations for the week ending Oct. 2, 1909, show 38,215 available ovens in the two districts, of which 33,892 or 88.7 per cent are active, and 4,323 idle.

The number of active ovens was increased last week 214, a gain of one half of one per cent over the preceding week.

Additional ovens were put in as follows: 24 at Republic, 20 at Atcheson, six at Labelle, 16 at Acme, 52 at Beatty, 23 at Carbon, 14 at Cofmann, five at Crystal, 14 at Searight, 78 at Thompson, 16 at Tower Hill and 31 at Virginia. An aggregate of 83 ovens were put out during the week at several works.

Owing to the irregularity of the operations at many plants, due to the shortage of miners, an accurate estimate of production is difficult, but from the best information we have, production for the week was about 431,555 tons, an increase of 2,631 tons over the week before.

Shipments to Pittsburg and points west were 12,575 cars, 160 more than were shipped the week before. Shipments to eastern points are reported as 801 cars, a decrease of 201 cars as compared with the preceding week.

Labor situation continues very unsatisfactory—if anything, worse than it has been. Information received from a number of works is to the effect that there are but very few plants not handicapped to a greater or less extent by the lack of miners or rather the continued idleness of a vast number of men for whom there is plenty of work.

The continued drouth has already interfered with operations and if it is not soon relieved, several hundred ovens will have to be put out.

Prices continue firm and advancing.

The unrestricted canvassing and daily delivery by brewery and distillery agents at the various works is blamed, and probably justly, with a great amount of idleness at the various coke plants throughout the region.

WESTINGHOUSE DIRECTORS.

At the annual meeting of the stockholders of the Westinghouse Airbrake Co., held Oct. 5, George Westinghouse was re-elected president and the following directors were chosen: Henry C. Bughman, John Caldwell, E. M. Herr, Charles McKnight, H. G. Prout, George C. Smith, Horace E. Smith, George Westinghouse and H. H. Westinghouse.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing concerns have filed articles of incorporation:

Downey Machine Co., Milwaukee, $25,000; by Frank J. White, Richard F. Downey and R. J. Quinn.

The American Perforator Co., Chicago, $50,000; machinery; by A. L. Day, C. G. McRoberts, Walter Hamilton.

Ballin Water Tube Boiler Co., Portland, Ore., $50,000; by Fred A. Ballin, Arthur Langguth and Edward G. Gordon.

The A. L. Malentz Glass Cutting Machine Co., St. Louis, $20,000; by A. L. Malentz, C. H. Prior and Frederick W. Schaab.

The Venn-Severin Machine Co., Chicago, engines and machinery, $25,000; by Theodore H. Venn, Frank W. Severin and Henry L. Venn.

The Sterling Electric Supply Co., Ltd., Toronto, $25,000, provisional directors, Alan G. Manly, Reginald W. Strickland and Philip W. Greene.

The W. E. Austin Machinery Co., Memphis, Tenn., $1,000; machine shop; W. E. Austin, W. W. Fischer, William Frey, J. A. Omberg Jr., Elias Gates.

A. Matthews, Ltd., Toronto, capital $30,000; roofing and sheet metal, provisional directors, Asa Matthews, Elizabeth M. Matthews, and John O'Donnell.

The Blake Sprayer & Foundry Co., Rotterdam, N. Y., $50,000; machinery and machine parts, mining and treating metals, etc.; by F. A. Blake, C. MacCall, D. W. Forsyth, Rochester, N. Y.

The Van Buren Engineering Co., New York city, machinery, power and excavating, $15,000; by George C. McCracken, Daniel J. Haner and C. Raymond Weaver, 21 Park Row, New York city.

The Oldham Engineering Co., New York city, engines, generators, pumps, bridges, structural work, etc., $20,000; by David J. T. Oldham, William S. Miller, Buel C. Hall, all of 115 Broadway, New York city.

The Retractile Mfg. Co., New York city, tools, machines and apparatus, $100,000; by George A. Arnold, 404 West 145th street, New York city; Charles E. Perkins, Yonkers, N. Y., and Chester H. Briggs, Plainfield, N. J.

The Turner Adjustable Double Deck Car Co., Chicago, $250,000; to build and rebuild freight, refrigerator, passenger cars; by A. L. Ballos, William H. Gruver, John H. Miller, H. B. Fiske and Harry C. Turner, Chicago.

W. D. Beath & Son, Ltd., Toronto, $100,000; overhead tracks and carriers and general foundry business; provisional directors, Lancelot B. Beath, Wm. D. Beath, Angus D. McArthur, F. Sommerville and W. A. Sadler.

The Automatic Woven Wire Supply Co., New York city, woven wire fabrics, $10,000; by Samuel Weisglass, 190 Pulaski street, Brooklyn; Wilber J. Pine, Oshkosh, Wis.; Charles I. Menezer, 204 Pulaski street, Brooklyn, N. Y.

The Van Neu Mfg. Co., 170 Broadway, New York city, typewriters and their equipment, $100,000; by Winfield S. Van Horn, Edward Neumann, Anton Neumann, Jersey City, N. J.; Thomas A. Hill, 395 Monroe street, Brooklyn, N. Y.

The De La Vergne Engine Co., New York city, machinery, engines, boiler pumps, ice-making and refrigerating machinery, $10,000; by Harry Praeger, 118 West 143d street; John J. McElhinny, 34 West 129th street; Robert D. Eggleston, 507 West 158th street, New York city.

New Construction:—

Teuscher & Sons Machinery Supply Co. has purchased ground in St. Louis for the erection of a factory.

The Waterbury Machine Co., Waterbury, Conn., has had plans drawn for a four-story factory, 35 x 80 feet.

The Chicago Screw Co., Fillmore and Homan avenue, Chicago, has taken out a permit to build a three-story factory to cost $13,000.

The American Malleable Co., Lancaster, N. Y., is building an addition to its plant, and also a fireproof vault for the storage of patterns.

The Pacific Car & Foundry Co., Portland, Ore., has been incorporated with a capital of $1,000,000, by J. W. Reiss and others, to erect a car building plant, probably at Vancouver, B. C.

The new building of the Columbus Bolt Works, Columbus, O., on West State street, is being constructed by the Concrete Steel Co. of Cincinnati. The building will be four stories, 60 x 180 feet.

The American Ornamental Iron & Bronze Co., Minneapolis, Minn., is preparing to proceed with the construction of a foundry at its plant. The building will be 39 by 72 feet and will cost $3,000.

The Clarage Foundry & Machine Co., Kalamazoo, Mich., has purchased land in that city on which it proposes to build a machine shop. The plant is now running 15 hours, and it would run day and night shifts if men could be obtained.

After having built several other structures the past summer, the Fairbanks-Morse Co. is planning to construct a two and three story shop 175 by 1,200 feet at Beloit, Wis. Construction will begin in the spring.

The Chicago Railways Co. has building projects in hand calling for an expenditure of $350,000. One of its new structures will be a car shop 500 x 456 feet upon which work is already started. It is to cost $200,000.

The plant of the United States Malleable Castings Co. on Woodville street, Toledo, O., is being enlarged because of steadily increasing business. The pattern room and office will be enlarged and so shifted that better handling facilities will be afforded.

The Merrill Iron Works, Merrill, Wis., secured plans for replacing its old foundry which was damaged by fire July 28, with a concrete structure, 40 by 60 feet. A modern core oven and power crane will be installed among the new equipment.

The Chester, Pa., plant of the American Steel Foundries will be enlarged by the erection of a new chipping shop. This will include the present blacksmith shop and will be a continuation of the main structure. It will be 50 by 75 feet and of brick construction. In addition repairs will be made to the furnaces.

The Detroit Seamless Steel Tubes Co., Detroit, is now erecting a large addition to its factory, and installing additional equipment which will increase its capacity about 30 per cent. This is made necessary by the rapidly increasing demand for its "Detroit" locomotive flues and mechanical tubing.

The Leader Foundry Co., Quincy, Ill., has commenced the erection of the superstructure upon the foundation erected one year ago. The new building will be 96 by 100 feet and will cost $10,000. When the structure is completed the machinery of the Sharp Machine Co. will be removed into it, the Sharp and

Leader companies having recently consolidated.

Minneapolis Steel & Machinery Co. has closed a contract with Albers Bros. Milling Co. for the following machinery for the new mill to be erected at Portland: A compound Twin City heavy duty Corliss engine, barometic condenser, two 250-horsepower Erie City vertical water tube boilers and accessories. The engines are of the special "rope-drive" models. The mill is to have a number of round steel grain tanks with a total capacity of 300,000 bushels, also to be erected by the Minneapolis Steel & Machinery Co.

General Industrial Notes:—

Stockholders of the Allis-Chalmers Co. will hold their annual meeting Nov. 4, at Jersey City.

The Youngstown Sheet & Tube Co. is rebuilding seven welding furnaces in the tube department, one of which has been relighted.

James Whitenack and Louis Fuse have purchased the Royal Foundry & Machine Co.'s shops at Cleburne, Tex., and will make extensive repairs.

The Hydro Engine Co., of Idaho, is preparing to build a factory in Boise. The company manufactures hydraulic machinery for mining and irrigation.

The Cincinnati Iron & Steel Co., Cincinnati, in its machinery department, is operating its Nugent clutch factory day and night, full force on each shift.

A giant forging hammer recently installed by Thomas B. Jeffrey & Co., Kenosha, Wis., manufacturers of the Rambler automobiles, was made by the Erie Foundry Co., Erie, Pa.

The stockholders of the Monroe Machinery Co., Monroe, Mich., a new concern, met recently and elected officers. The company proposes to buy a site and build a foundry as soon as possible.

The Penn Limestone Co., subsidiary to the United States Steel Corporation, is opening a new quarry near Hillsville, Pa., to which the Mahoning & State Line railroad is building a siding.

The Falk Co. of Milwaukee is producing several pieces of intricate four-way manganese steel crossings for use of the Milwaukee Electric Railway & Light Co. on extensons in Milwaukee.

The Fuller & Johnson Mfg. Co. of Madison, Wis., has filed an amendment to its articles of incorporation, increasing the number of directors from nine to eleven and the number of vice presidents from one to two.

The Optenberg Iron Works, Sheboygan, Wis., will build the 40,000 gallon steel tank and structure for the new sprinkler system to be installed in the big plant of the American Hide & Leather Co. in that city.

The contract for the construction of the big docks at Mission river near Fort William, Ont., has been awarded by the Public Works Department to Heney & Smith of Ottawa at a figure in the neighborhood of $350,000.

The National Tube Co. has located two additional railroad tracks near its blast furnaces at Lorain, O., in order to fill additional stock piles. The company has the largest quantity of coke, ore, limestone and coal stored at Lorain ever piled there.

The business heretofore conducted under the name of William Henderson & Son, New Brunswick, N. J., has been incorporated under the name of the New Brunswick Iron Works by Alexander and Thomas Henderson, sons of William Henderson, who died a year ago.

The General Brass & Tool Works, Nashville, Tenn., which was recently incorporated with a capital stock of $10,000 and of which John H. Lawrence has been named general manager, is having plans prepared to establish a brass foundry and machine shops for light work.

The West Coast Wagon Co., Tacoma, Wash., has purchased 22 lots, upon which it proposes to build a shop about 100 x 300 feet, and equip it with machinery for the purpose of handling structural steel. The structural steel department of this company will be moved from its present plant in Tacoma to the new establishment.

The McAllister-Byrne Construction Co. has been incorporated with $25,000 capital stock by M. McAllister, John H. Byrne, S. K. Hine, E. H. Lotze and W. R. Phibbs, for the purpose of reorganizing the Ohio Boiler Co., of Girard, O. Mr. Byrne will be manager. New machinery will be added and shipping facilities increased.

The Jeannette Machine Co., Jeannette, Pa., which was recently incorporated, was formed to continue the business carried on by a partnership under the same name, and to extend it. The company's product formerly consisted largely of machinery and presses for glass factories and small gas engines, but it will soon have certain electric appliances to put on the market and is also branching out into the automobile business. A two-story building, 40 x 100 feet, is to be built.

The Minnesota Steel Co., subsidiary of the U. S. Steel Corporation, has awarded the contract for a 300-foot steel bridge across St. Louis river at New Duluth to the American Bridge Co. The bridge will carry electric and steam railway tracks. The Interstate Transfer railroad will be completed about the same time as the bridge, July 1, 1910. A mile and a half of steel has already been laid. No work will be done on the Mesabe road spur from the steel plant to Adolph until the construction of the plant is actually begun.

Fires:—

The pattern room of the Hoehne Machine Co. at Kaukauna, Wis., was damaged by fire of unknown origin last week. New machinery in the shops was damaged several thousand dollars by water.

The Kankakee Car Equipment Co.'s plant, Kankakee, Ill., was recently visited by fire. Temporary buildings which housed the paint and blacksmith shops were damaged, but the loss on machinery and equipment was small.

The pattern warehouse of the Brookhaven Foundry & Machine Co., Brookhaven, La., was badly damaged by fire Oct. 1. The company carried $5,600 insurance on the contents including mill supplies. The loss on patterns alone is placed at $35,000.

TRADE NOTES.

The Hill Clutch Co., Cleveland, manufacturer of power transmission machinery, announces the appointment of G. W. Hoffman, as sales engineer in charge of its Chicago office, which is located at No. 610 Marquette building.

C. H. Lewis & Co. announce that they have become engaged in the sale of iron, steel, pig iron and coke with offices at 718 Park building, Pittsburg, and 518 Citizens building, Cleveland. C. H. Lewis of the firm was formerly associated in pig iron selling with the United Iron & Steel Co., Pittsburg, and the Cherry Valley Iron Co., Pittsburg.

Reports from Philadelphia and New York are that a number of interests, which heretofore have engaged either in the pig iron or importing trade, are now endeavoring to establish connections with foreign miners of iron ore. Aside from the closing of the deal by which B. Nicoll & Co. became the American representatives of Muller & Co., The Hague, no success has been reported.